H. D. Arnold.
Norton, Mass.

Geo. F. Arnold

THE PATHOLOGY OF THE ŒSOPHAGUS.

AN ESSAY

ON THE

PATHOLOGY OF THE ŒSOPHAGUS.

BY

JOHN F. KNOTT.

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PREFACE.

THE following pages are a reprint of the Essay to which was awarded the Gold Medal of the Pathological Society at the close of the Session 1876-77.

As a favourable opinion of the contents was then expressed by the judges, I determined to publish it as soon as leisure would permit.

The fact, that the whole is the work of a medical student hastily constructed during the few hours of leisure that were left him by more pressing engagements, will account for its deficiencies in merit, literary and scientific.

No changes have been made in the text except the necessary corrections of a few verbal mistakes which had escaped notice in the manuscript copy, as I have preferred that it should represent the original as accurately as possible.

34 *York-street*,
September 20, 1878.

Subjoined is the Preface which was prefixed to the manuscript Essay :—

The "Pathology of the Œsophagus" is a subject which—considering the vital importance of the functions which this organ has to fulfil, and the terribly fatal results of disease

attacking it—does not seem to have received its due proportion of attention from writers on pathology. The authors who have entered into the subject in anything like an exhaustive manner have indeed been few and far between, and the greater number of them having been consigned to the highest shelves and remotest recesses of our libraries, are there covered with the accumulated dust of years, and it requires some little amount of trouble and research on the part of the student of the present day to make himself acquainted with them. The pathological changes which accompany œsophageal disease do not present much that is special or peculiar in their character; and the comparative neglect with which the subject has been treated is, doubtless, to be attributed, partly to this circumstance, and partly to the comparative rarity of disease of the part. Having regard to the latter fact, the writer of the present essay does not think it necessary to offer any apology for having borrowed his materials almost entirely from the published writings of others. The experience of a student in his third winter of Hospital attendance can be, at best, but a very limited one, even in cases of the most frequent occurrence; how much more so in cases of œsophageal disease. "Walk all the hospitals in Dublin for weeks together, and in the long catalogue of diseases you may not see one of the œsophagus." These words are just as true of the present time as they were of that of six-and-thirty years ago, when spoken by Professor Benson to his class at the Royal College of Surgeons. The few cases of œsophageal disease, which have come under the notice of the writer, did not present much of special interest, and, accordingly, but slight allusion will be made to them in the following pages.

As an intimate acquaintance with the normal healthy anatomy of a part, both general and minute, is absolutely

necessary in order to be able to appreciate the changes which are found therein in the course of disease, it has been thought proper to devote the first chapter of the following essay to the consideration of the relative and structural anatomy and physiology of the parts concerned.

In the chapter on each separate affection of the œsophagus, cases have been collected from all the sources to which the writer had access, illustrating the various symptoms which have been observed during life, and also the pathological conditions found on post-mortem examination.

The subject of treatment has not been entered into, inasmuch as it has not been considered to fall within the scope of a pathological essay; but some slight allusions will be made to it, in those instances in which, as sometimes happens, the effect of treatment forms one of the chief clues to the nature of an obscure disease.

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PATHOLOGY OF THE ŒSOPHAGUS.

CHAPTER I.

ANATOMY AND PHYSIOLOGY OF THE ŒSOPHAGUS.

Course.—The Œsophagus or Gullet (French, Œsophage; German, Speiseröhe; Latin, Gula;) is the muscular tube which, leading from the pharynx to the stomach, serves to convey the food from the former to the latter in the last stage of deglutition. It commences at the back of the cricoid cartilage, and in front of the fifth cervical vertebra; passes downwards from the lower part of the neck into the thorax, where it lies in the posterior mediastinum; pierces the diaphragm opposite to about the ninth dorsal vertebra, and ends immediately after by opening into the cardiac orifice of the stomach. Its length in the adult is about nine or ten inches. Its diameter is less than that of any other portion of the alimentary canal; not being more than one inch at the upper extremity, when this portion of the tube is in a state of moderate distension. It is slightly increased from this point to the opening in the diaphragm, where it undergoes another constriction. From the latter point to its termination in the stomach it dilates gradually, so as to present a somewhat funnel-shaped expansion at its lower extremity. The course of the œsophagus is not directly downwards, although nearly so; but it presents in its course three slight curvatures. The first of these is an antero-posterior, by which it adapts itself to the curve of the spinal column. The other two are lateral: the first is from its origin, where it commences in

the middle line, and passes downwards with a slight inclination to the left as far as the side of the seventh cervical vertebra, from which point to the fifth dorsal it gradually approaches the middle line again, and so terminates the first curve: the second is formed by the deviation of the tube to the left from the side of the fifth dorsal vertebra to the œsophageal opening in the diaphragm.

Connections.—In the lower cervical and upper dorsal regions the œsophagus lies immediately in front of the spine and longus colli muscle, separated from the former only by the anterior common ligament, some loose areolar tissue, and one or two lymphatic glands: also between it and the upper dorsal vertebræ the thoracic duct insinuates itself in its passage upwards as it turns obliquely from right to left. In its lower third it lies in front of the aorta. In front of the œsophagus we have, in the whole of the cervical and the upper part of the dorsal portions, the trachea, which is closely applied to its anterior surface; a small portion of the left bronchus at its origin from the trachea also lies in front of it. Lower down it is covered by the back of the pericardium. On either side in the neck are found the recurrent laryngeal nerves, which ascend in the angular space between the œsophagus and the trachea: also the common carotid arteries: but from the inclination of the œsophagus to the left it comes into more immediate contact with the artery of that side. The lateral lobes of the thyroid body also touch it on each side, especially on the left; and in those rare cases where the isthmus passes behind the trachea it lies in front of the œsophagus. The aorta, except near the diaphragm, where the œsophagus lies in front of the vessel, lies rather to the left, and the vena azygos to the right; the thoracic duct also lies on its right before it turns to the left to get to its posterior aspect, as already mentioned. The pleura of either side also lies in contact with it in this region. Lastly, though by no means of least importance, we come to the pneumogastric nerves, which are more intimately related to the œsophagus than any of the structures which we have hitherto mentioned. Behind the

lower part of the root of the lung the vagus nerve on either side becomes closely applied to the side of the gullet, and descends in close contact with it to its termination in the stomach. In this course the nerve of the left side comes gradually forward to the anterior surface, the right nerve at the same time winding round to the posterior aspect of the tube. As they descend they give off innumerable branches which interlace in every direction around the tube (hederæ admodum), and so form the "plexus gulae."

Bloodvessels.—The arterial supply of the œsophagus is derived from branches of the inferior thyroid, bronchial, phrenic, and coronaria ventriculi arteries, together with the œsophageal branches of the thoracic aorta. They have for the most part a longitudinal arrangement.

Nerves.—The muscular walls and the mucous membrane of the œsophagus are entirely supplied by the pneumogastric nerve and its branches.[1] The upper portion of the tube is supplied by branches of the inferior laryngeal nerve, the part of the tube behind the root of the left lung is supplied by filaments derived from the posterior pulmonary branches, while that portion from about opposite the lower border of the root of the lung to its termination is supplied by the plexus gulæ. These branches are both sensory and motor, but probably the latter largely predominate, for the mucous membrane, although sensible to extremes of heat and cold, to feeling of distension, and of a burning sensation on application of strong irritants, is by no means acutely sensitive.

Structure.—The coats of the œsophagus are three in number: *muscular*, *submucous*, and *mucous*.

The muscular coat consists of two separate layers; an external, the fibres of which are longitudinally arranged, and an internal, the direction of whose fibres are circular. This arrangement prevails throughout the whole extent of the ali-

[1] *Vide* Experiments, p. 9, *et seq.*

mentary canal, but in no other part are the two layers so well developed, or so uniformly disposed, except perhaps towards the lower end of the rectum.

The longitudinal fibres commence above by three separate fasciculi: an anterior, and two lateral. The anterior is attached to the vertical ridge on the back of the cricoid cartilage; the lateral bundles are blended with the inferior fibres of the lowest constrictor of the pharynx. The fibres from these several origins spread themselves out as they descend, and soon become blended at their adjacent margins so as to form a complete layer around the tube.

The internal or circular layer is continuous with the inferior constrictor at its lower margin. The rings which are formed by the fibres of this layer have a horizontal direction towards the superior and inferior extremities of the tube: in the intervening portion they are somewhat oblique. This layer is considerably thinner than the external. At the lower end of the œsophagus both layers become continuous with those of the muscular coat of the stomach; the longitudinal with the longitudinal, and the circular with the oblique respectively.

The submucous, areolar, or nervous coat (tunica nervea) is placed between the muscular and mucous coats, and connects them loosely together. It is much thicker than the mucous membrane.

The mucous membrane which lines the œsophagus is of a firm texture, and is paler in colour than that of either the pharynx or stomach. From the looseness of the areolar layer by which its outer surface is connected to the muscular coat it is freely movable on the latter. As a consequence of this arrangement the mucous membrane is thrown into a number of parallel longitudinal folds by the action of the circular muscular fibres when the latter are in a state of contraction, as is always the case when the tube is not distended by the passage of food, &c. The adjacent margins of these rugæ lie in mutual contact when the organ is in a state of repose; they are completely obliterated when the canal is distended.

The fibrous layer by which it is connected to the sur-

rounding parts is reckoned as a separate coat by some. It consists of a dense layer of connective tissue.

Minute Anatomy.—The muscular coat of the œsophagus in its upper third is entirely made up of striated muscular fibres, with some anastomosing bundles. As it passes from the neck into the thorax contractile fibre cells begin to appear, some isolated, others in groups, and increase in number as the tube descends, till about the middle, where the entire muscular coat appears to be formed of the smooth variety of cells,[1] which structure continues throughout the whole of the digestive tract. The change of tissue is first seen in the circular layer. According to some observers, however, a few striped fibres are to be found mingled with the others along the whole length of the tube.[2] Hyrtl has observed that the longitudinal fibres are sometimes joined by a broad band of smooth muscle, which ascends from the left pleura, and sometimes also by another from the left bronchus.

The mucous membrane lining the interior of the œsophagus is, as already noticed, loosely attached to the muscular coat by means of the submucous areolar tissue. It contains numerous simple papillæ, and the whole is covered with a strongly laminated squamous epithelium, which is of so dense a character as to have been considered by the old observers as more nearly akin to cuticle than to ordinary epithelium. It retains this character throughout the whole length of the canal, and may be traced through the cardiac orifice of the stomach, within which it terminates abruptly by a kind of fimbriated border. In the upper part of the œsophagus large numbers of isolated bundles of contractile fibre cells, arranged in a vertical direction, are to be found scattered through the mucous membrane. Lower down these increase in number, and spread themselves out so as to form a continuous longitudinal muscularis mucosæ, which occupies the deeper portion of the membrane.[3] The latter (at least in the new-born child) is formed of distinct lymphoid tissue.[4]

[1] Welcker and Schweigger-Seidel.
[2] Ficinus.
[3] Kölliker, Henle, Klein.
[4] Klein.

The œsophagus is provided with small racemose glands known as the "œsophageal glands." They occur in varying numbers, being sometimes scanty, sometimes abundant, and are found imbedded in the submucous coat. At the lower end of the œsophagus, about the cardiac orifice, are found a great number of small glandular structures, which lie so closely together as to form in this situation an elevated ring about 2 mm. in height. These are called (after the name of their discoverer) the *cardial glands of Cobelli*.[1] They do not reach the submucous tissue.[2]

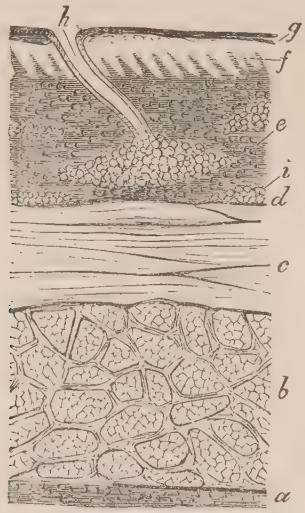

PLATE I.—Section of the coats of the Œsophagus (from Kolliker), $\frac{4}{1}$: (section is transverse, and from near the middle of the tube); *a*, fibrous covering; *b*, section of longitudinal muscular fibres; *c*, transverse muscular; *d*, submucous layer; *e*, mucous membrane; *f*, its papillæ; *g*, laminated epithelial lining; *h*, opening of a mucous gland; *i*, fat-vesicles.

The arrangement of the bloodvessels does not present any peculiarity. As has been already mentioned, they are chiefly longitudinal in direction, and they break up into a moderately

[1] Frey's Histology, by Barker, p. 473. [2] Kölliker.

loose network of capillaries. They also send loops into the papillæ.

The lymphatics present a retiform interlacement with small meshes. The tubes measure about ·02 or ·0699 mm. in diameter, and are for the most part arranged in a direction parallel with the axis of the tube. They are situated in the deeper strata of the mucous membrane, and in the submucous connective tissue.

The nerves are found in considerable numbers in the mucous membrane. Their mode of termination has not been accurately made out. Kölliker was unable to trace them into the papillæ. Gangliated nerve plexuses have been found between the two layers of the muscular coat (Auerbach), and in the submucous tissue (Meissner), as in other parts of the alimentary canal.

Sec. 2.—DEVELOPMENT OF THE ŒSOPHAGUS.

The first trace of the future pharynx is found about the sixth week of fœtal life, in the shape of a large opening, which is afterwards partially closed in the formation of the face. This cavity remains in the form of a cul-de-sac, until the communication is established between it and the œsophagus. The latter first appears in the form of a tube, closed at either extremity, which finally opens into the pharynx above and into the stomach below. At this period there is really no thoracic cavity, and the upper part of the stomach is very near the pharynx: the œsophagus is, therefore, very short. The rudimentary lungs appear by its side, and the heart lies just in front. As the thorax is gradually developed, the œsophagus becomes longer, till it attains its normal proportions.

Sec. 3.—FUNCTIONS OF THE ŒSOPHAGUS.

The third period of the act of deglutition, in the course of which the œsophagus is called upon to act, is simpler in its mechanism than either of the two preceding. The bolus

having been propelled by the action of the pharyngeal constrictors within the upper extremity of the canal, is then transmitted along its course by the action of its own muscular walls. The longitudinal fibres first contract, and in so doing slip the tube, which is lubricated by its own glairy secretion, above the bolus; the contraction of the circular fibres immediately follows, and proceeds from above downwards by a progressive peristaltic action, which, commencing behind, propels the bolus onwards into the stomach.

Magendie, in his experiments on the lower animals, observed that while the peristaltic contraction of the upper two-thirds of the tube was immediately followed by relaxation, which continued till the next act of deglutition, the lower third remained contracted, generally for about thirty seconds after the passage of the bolus into the stomach. During the contraction this portion of the œsophagus was hard, like a cord firmly stretched. This was followed by relaxation; and this alternate contraction and relaxation continued constantly, even when the stomach was empty, and during digestion the contractions were frequent in proportion to the quantity of food in the stomach. The contraction was always increased by pressing the stomach and attempting to force some of its contents into the œsophagus. This provision is, undoubtedly, important in preventing regurgitation of the contents of the stomach, especially when the organ is subjected to pressure, as in the act of urination, of defecation, &c.

The diaphragm has also a powerful influence upon the calibre of the canal at the point where it is pierced by the latter; so much so, that the decussating muscular bands formed by the crura, and which surround the œsophageal opening, have been described by some writers as an œsophageal sphincter (*vide* Jour de la Physiologie, 1862). The anatomical disposition of the parts is such, that the contraction of these muscular fibres has a tendency to close the orifice, and this effect is really produced at each inspiration. The functional importance of the arrangement which we have mentioned will be apparent when we remember that the descent of the diaphragm, which takes place at each inspiration, com-

presses all the abdominal viscera, and in the absence of some such natural provision would probably cause regurgitation of food when the stomach is distended.

Magendie, in his observations on the lower animals, found that the bolus sometimes occupied two or three minutes in its descent, and was often momentarily arrested in its course: this occurred towards the lower end, where the contractions were slower than above.

He was unable to arrive at any definite conclusion as to the period occupied by the act in the human subject.

Hamburger[1] has advocated the employment of auscultation, in observations made on the act of deglutition, as a means of diagnosis in diseases of the œsophagus. He found the time to vary with health, &c.

The bolus in its descent compresses the glands and their ducts. From the oblique direction of the latter their contents then easily escape, and so further lubricate the passage.

Experiments.—Numerous experiments have been made by Magendie, Reid, Marshall Hall, and others, to determine accurately the functions of the nerves supplying the œsophagus, and the effects produced by their division, stimulation, &c. Of these the most elaborate in design, and the most satisfactorily recorded, which the present writer is acquainted with, are those of M. Chauveau, which have been published by him in a series of papers in the Journal de la Physiologie, 1862. Subjoined are those results of his experiments with which we are directly concerned:—

Stimulation.—(*a*) The œsophagus and stomach always contract whatever bundle of roots of the pneumogastric nerve is irritated, but the contraction is stronger, especially in the tracheal region, when the stimulus is applied to the higher bundles.

(*b*) The effect of continued irritation of the pneumogastric

[1] *Vide* Dublin Quarterly Jour., xxxv., p. 423.

on the tracheal portion of the œsophagus is a permanent and forcible tetanic spasm of its muscular fibres, exactly similar to that observed in case of the voluntary muscles.

(*c*) In the portion below the bifurcation of the trachea the effect is a series of undulatory, vermicular movements, propagated in regular succession from above downwards.

Section.—(*a*) When the nerves supplying the upper portion of the œsophagus were divided, the muscular fibres of the cervical portions of the tube appeared to be completely paralysed. The passage of food provoked no contraction of the walls. It was filled and emptied in a manner which seemed to be altogether passive. The aliments were pushed into the tube by those behind them at each act of deglutition, and also by the pressure which the animal made on the tube by contracting the muscles of the front of the neck. Sometimes the portion of the œsophagus which was laid bare at the root of the neck emptied itself completely when the animal ceased to eat for a little time; but it was without any contraction of its muscular fibres; it merely yielded to the atmospheric pressure. At that moment there seemed to be a kind of aspiration of the ingesta by the portion of the tube which lay within the thorax.

The conclusions arrived at from the results of the above experiment were as follows:—The aliments swallowed by the animal still found their way easily into the stomach. This was due to (1) the energy of the contractions of the pharyngeal muscles which pushed the mass of food which accumulated in the œsophagus onwards at each act of deglutition; (2) a peculiar movement of the neck of the animal, by which the anterior cervical muscles in contracting were made to compress the tube strongly; lastly (3), that kind of aspiration exercised by the thorax which drew into the thoracic portion of the tube the aliments which had been arrested towards the inferior extremity of the neck.

(*b*) Paralysis of the inferior motor nerves of the œsophagus was not to be conveniently obtained, except by section of the pneumogastric nerve *en masse* in the neck. The section above

the thorax paralysed both the superior and inferior œsophageal nerves. The result was a total inertia of the tube from its origin to its termination; so that when the animal ate, the food collected in the interior, so as to form an uninterrupted column within it. When the tube was completely filled, the lower extremity of this column sometimes dropped into the stomach, as a new bolus was forced by the contraction of the pharynx into the upper part of the canal.

Claude Bernard, in his lectures at the College de France (Session 1859-60), demonstrated to his class some of the effects of section of the pneumogastric nerves. Having divided them in a rabbit, which had been purposely kept fasting for the previous 24 hours, the animal was immediately presented with food, which it swallowed with great voracity. Symptoms of suffocation were rapidly produced; but the animal soon recovered, and attempted again to eat, which brought on another fit. At the close of the lecture the animal was killed and opened. The œsophagus was found entirely filled up with undigested food, from the cardia to the pharynx, while the stomach only contained some vestiges of the last meal. . . . "The food was prevented from passing into the stomach by a spasmodic contraction of the cardiac orifice. In the course of a day or two this peculiar state ceases to exist, and the animal is generally able to eat about thirty-six hours after the operation.

"When the œsophagean duct is opened in a horse, and a ligature applied under the opening, if food is given to the animal, it escapes from the aperture in small separate masses; if, on the contrary, the œsophagus is divided, the aliments swallowed make their appearance in one continuous mass, the upper portion pushing out the lower parts. In other words, the power of contraction of the œsophagus is exerted in the first instance, while the impulsion is entirely derived from the pharynx in the second. The natural conclusion which we arrive at from these experiments is, that œsophagean contractions cannot be produced when fixed points of insertion no longer exist at each end of the membranous tube."[1]

[1] *Med. Times and Gazette*, July 7, 1860.

The latter conclusion has been, however, completely disproved by the carefully-conducted experiments of Mosso.[1]

The movements of swallowing were excited by the injection of water into the pharynx, or by mechanical irritation of the root of the tongue, or by electrical irritation of the nervus laryngeus superior. He found that the contractions were propagated continuously down the œsophagus even when the tube was completely cut in two, nay more, when a considerable portion of the tube was excised there was no interruption. The application of one or several ligatures did not cause any interruption. The propagation of the movement, he concludes, clearly depends on the nervous centre, and this view is further supported by the fact, that partial section of the nerves supplying the œsophagus paralyses that part to which the injured nerves are distributed, without affecting any other portion of the tube.

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[1] *Vide Lancet*, 1874, vol. ii., p. 281.

CHAPTER II.

ABNORMALITIES AND MALFORMATIONS.

Instances of incomplete development of the œsophagus have been met with, and, although any deviation from the natural

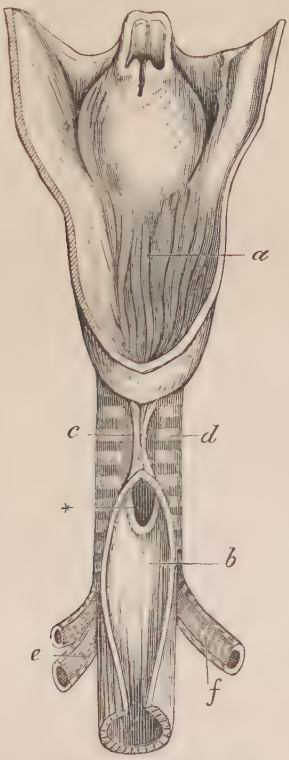

Plate II. (copied from Virchow's "Archiv.," Bd. xlvii., Taf. xiii.) represents the condition of the parts in Luschka's case, as seen from behind. * Communication with trachea; *a*, upper portion of œsophagus ending in a cul-de-sac, and connected with the lower part by a muscular band, *c*; *b*, lower part of gullet, ending in the trachea; *d*, trachea; *e*, left; *f*, right bronchus.

conformation of this part is among the rarest of abnormalities, yet scattered cases of the kind are to be found recorded by various observers.

One of the most frequent irregularities met with is where the median portion of the tube is deficient; the upper portion following the normal course for a short distance and ending in a cul-de-sac, while the upper extremity of the lower portion opens directly into the trachea. Cases of this kind have been met with by Van Cuyck,[1] Porro,[2] Padieu,[3] Ogle,[4] Hirchsprung (*vide* p. 25, *et seq.*), Luschka, and others.

In another form of arrest of development, the upper and lower ends have each ended in a cul-de-sac, the intermediate portion being merely represented by a fibrous cord which stretched between the two. Instances of this *lusus naturæ* have been seen by Ogier Ward,[5] Warner,[6] and some other other observers.[7]

In some other and rarer cases, in which the process of growth had ceased still earlier than in those already referred to, the only traces of an œsophagus to be found were two rudimentary pouches of very small dimensions, and connected, one with the lower end of the pharynx, the other with the upper border of the stomach at the usual situation of the cardiac orifice.

The "new-born," who are the subjects of the above malformations, must necessarily perish of inanition within a few days after their entrance into the world. Blundell has drawn a vivid picture of the appearances presented by the infant under these circumstances:[8]

"All the pains of strangulation may be suffered every time that the patient attempts to swallow. It takes the pap greedily, a small effort of deglutition follows, then in a few seconds the countenance alters, the placid look of infancy changes for that of distress and agitation,

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[1] *Vide Lancet*, vol. iv., p. 477. [2] *Ib.* vol. ii., 1871.
[3] *Ib.* vol. i., 1835-6. [4] Trans. Lond. Path. Soc. (Jan. 15, 1856).
[5] Trans. Lond. Path. Soc. (Nov. 4, 1856).
[6] *Vide* Warner's case, *Lancet*, vol. ii., 39-40.
[7] London Med. Chir. Review (Oct., 1840).
[8] *Lancet*, 1828, vol. ii., p. 742.

the breathing is intercepted, the face darkens, the chest heaves, all the muscles quiver, and convulsions, followed by a dead quiet ensue: the child remains in a state of asphyxia till the very sight of it as you watch the returning life shortens the breath with anxiety, and lengthens seconds to minutes. At length you think it is all over. Yet as you rise from the chair a small struggle is observed, and the food taken is emptied from the mouth, life and breath being again restored, to be again miserably interrupted should the attempt be repeated. Infants thus treated die many deaths. Severer symptoms are not produced by strangulation with the rope."

In all the cases symptoms similar to those described above have been present. The milk was in some cases regurgitated instantly, and always returned unchanged. Hirschsprung made "Congenital occlusions of the œsophagus and of the small intestines" the subject of his "Thesis" for the degree of Doctor in Medicine.[1] He gives the details of fourteen cases of congenital occlusion of the œsophagus, all of which were of the first variety which we have mentioned. In all the cases the upper part of the œsophagus was found expanded into a large sac, formed of its normal membranes, and terminating in a rounded shape at different distances from the mouth. The greatest depth was reached in two cases, where the sac was not half-an-inch from the bifurcation of the trachea. From the stomach the lower extremity of the œsophagus ascended and opened into the trachea or one of the bronchi. In eight cases the point of inosculation presented a regular smooth-edged, oval opening in the back part of the trachea at varying distances from its bifurcation. In four cases the œsophagus opened exactly into the bifurcation; in one it opened in the right, in one into the left bronchus. In nine cases a connection between the two parts is mentioned, twice by means of a broad muscular bundle, in the the other instances by means of a slight fasciculus of muscular filaments along the back of the trachea. In one case there was no trace of connexion. In the remaining four cases there has been no reference made to this point. The mucous membrane, with a single exception, was perfectly healthy. In this

[1] Copenhagen, 1861.

case there was a peculiar verrucose development in the fundus of the sac, and a superficial inflammatory condition of the mucous membrane in the lower part, with a slight cicatricial appearance in the cardia, together with numerous small ulcerations in the stomach. In three of the cases *atresia ani* was also present, with absence of the lower part of the rectum. The intestinal tube, in all three, ended in close connexion with the posterior surface of the bladder, and in two of the cases a communication existed between the two organs.

In one case cartilaginous rings similar to those of the trachea were found in the lower part of the œsophagus.

With regard to the true etiology of the lesion there is a great difference of opinion among those who have devoted attention to the subject. Rokitansky believes that it is due to a destructive process which takes place during intra-uterine life, and the researches of this pathologist, as well as those of Billard, Cruveilhier, Velpeau, and Simpson, show that the embryo is liable to an amount of inflammatory disease quite competent to produce such abnormalities. On the other hand, Pagenstecher, Levy, and Gernet consider the affection to be the result of an arrest of development. Levy suggests that embryology may hereafter show that the œsophagus is developed in two different portions. Hirschsprung, who has also adopted the view of the latter writers, opposes the inflammatory theory with the following arguments, which appear to us indisputable :—

"It has been already shown that inflammation of the mucous membrane and follicular ulcerations have been found in the œsophagus in newly-born children, and the possibility that these processes might "in certain cases produce partial destruction and adhesion of the canal, cannot therefore be altogether denied. . . . . But in that case we ought to be able to demonstrate the morbid process in its ordinary stages, and to trace it to its usual termination—a more or less irregular cicatricial formation ; but in opposition to this we find in only a single case a trace of an ulcerative process, which is evidently of a secondary nature : in no other instance is there the least evidence of cicatricial formation, but in all a regularly rounded cul-de-sac, with healthy mucous membrane, and a perfectly regular inosculating opening into the trachea, which decidedly refutes the

idea of any connection with a destructive ulceration. Moreover, the affection is marked by different forms, which could not possibly depend upon an inflammatory process. How, for example, could it be supposed that the formation of cartilaginous rings in the lower part of the œsophagus, mentioned in the sixth case, should be so produced? A perforating ulceration in the wall of partition might give rise to a communication upon the two parallel canals; but can it be supposed that the opening into the right or left bronchus could be produced in a similar mode without the existence of more considerable destruction? This question must be answered decidedly in the negative, and we are therefore justified in raising a strong objection to Rokitansky's theory, which is not based upon his own experience, and which manifests only a superficial knowledge of the cases he quotes. At the last Scandinavian meeting of naturalists, it was only want of time which prevented Professor Levy, when exhibiting the preparations connected with this subject, from entering a decided protest against Rokitansky's theory in general, and especially against his use of Levy's name in support of the same."

The frequent co-existence of the lesion in question with other effects of arrested development, of the nature of which there can be no doubt, is another strong argument in favour of the same opinion. The author draws further arguments in support of the same view from comparative anatomy and from the history of development. For example, it is well known that in some fishes the swimming bladder, which is generally looked upon as the rudiment of an undeveloped lung, is in open connexion with the œsophagus, and Valentin and Ammon hold, in opposition to the old opinion, that the œsophagus is formed by the junction of two parts. Of these, it is always the lower which communicates with the air-tube.

Dilatation.—Cases of congenital dilatation of the œsophagus have been recorded. In some of these the enlargement of the tube has been such as to represent pretty accurately the pouch which is found on the tube in birds, and known as the "crop" (ingluvies). Instances of this peculiarity have been recorded by Grashuys and Vicq-d'Azyr, and it is probable, as Mondiere[1] suggests, that many of the cases of

[1] Archiv. Gen. de Med., ii. serie, ii., 28.

dilatation of the œsophagus which have been observed have had for their starting-point some such congenital disposition which afterwards became exaggerated by the detention of food.

The prominent symptoms which have been observed in these cases are dysphagia and regurgitation of food. The latter has been so marked as to amount to a regular habit of rumination.

Plate III. represents the parts in Dr. Wilks' case.

At the upper end the thickness of the coats is intended to be shown in section.

At the lower end is seen the narrowing of the tube just above its junction with the stomach.

(From the plate illustrating Dr. Fagges's communication, Guy's Hospital Reports, 1871-72, Vol. XVII., 417.)

An interesting, and we believe an almost unique case of this kind, was brought under the notice of the Pathological

Society of London, by Dr. Wilks, who showed the specimen for Dr. Rootes, of Ross (May 1, '66). The following is a condensed account of the case :—

"The specimen had been taken from the body of a man of seventy-four, who had died of pneumonia. He had suffered all his life from dysphagia. He had consulted Sir A. Cooper for this forty years before. He had always been obliged to eat slowly and carefully, and to wash down each bolus with a draught of fluid. He never partook of a meal of which he did not bring back some portion, so that he had been, in fact, a ruminating animal. The œsophagus was as large as an ordinary-sized colon, and its calibre was pretty uniform throughout. It was six and a-half inches in circumference in the undistended state. The cardiac orifice was narrower than usual, barely allowing a finger to be pressed through, but there was no trace of disease to account for this contraction. The walls of the tube were very much thickened from increased muscularity. The stomach was normal."

Dr. Wilks believed that the dilatation had been congenital in this case. The man himself used to attribute it to straining at heavy weights when a boy. If the cardiac constriction had been congenital, as seems probable, it doubtless aided considerably in the production of this enlargement, which may have existed from birth in a slighter degree. This view, as appears to us, is strengthened by the fact of the co-existing hypertrophy of the muscular walls, which would seem to have been a compensatory effort of nature to overcome a fixed obstacle.

The muscular coats of the œsophagus are found to be hypertrophied in these cases. In those of secondary dilatation, as we shall see by-and-by, the opposite condition of atrophy and attenuation is sometimes met with ; but is hardly ever seen, we believe, in congenital cases.

A case of dilatation (believed to be congenital) has been reported by Dumas,[1] in which the lower extremity of the tube was engaged, and in such a manner as to appear to him to resemble the first stomach of a ruminant animal. A similar malformation has been recorded by M. Della Chiaga, of

[1] Recueil periodique, xxiii., 59.

Naples. An enormous dilatation of the lower part of the œsophagus existed, "forming a tumour, or rather a pouch analogous to the first stomach of ruminant animals, and in which the ingesta remained for some time, to be afterwards rejected by a kind of regurgitation. The muscular walls of the pouch were of extraordinary thickness." The case had not been diagnosed during life; it proved fatal after dreadful sufferings of many years. M. Della Chiaga believes the affection to have been congenital; small at the time of birth, but gradually increasing in size, owing to the pressure of the aliments detained in it.

In Meckel's plates of Pathological Anatomy, we find the representation of an œsophagus bifurcating opposite the first rib: the branches go off in a semi-circular form, and continue distinct till they arrive opposite the sixth rib, when they approximate, unite closely, and at last the œsophagus becomes single again, and continues so for the rest of its course.

CHAPTER III.

Having discussed the anatomical relations of the œsophagus, its structure and functions, and noted briefly the forms of malformation and developmental arrest which have been met within this organ, we shall now proceed to consider the various pathological changes which may be produced in its textures in the course of disease. As our minds are still fresh from the subject of dilatations, the first pathological state we shall consider is that of

DILATATION OF THE ŒSOPHAGUS.

The form of dilatation which we have now to consider is the "acquired;" that variety which has been met with as a "congenital" condition has already engaged our attention. Instances of this class are much more numerous than those which date their origin from the period of intra-uterine existence.

Rokitansky—whose classification we shall adopt—has arranged the varieties of this condition under three heads :—

(1.) The *cylindrical* or fusiform; in which a great part of the length of the canal is engaged, or, as sometimes happens, the whole extent of the pharynx and œsophagus may present this condition.

(2.) The *sacciform;* in which pouches (one or more) are formed, which involve all the coats of the œsophagus.

(3.) The *hernial;* in which the mucous membrane alone dilates, and, protruding through the muscular coat, forms diverticula or herniæ.

I. The first variety is but rarely met with. In those cases which have been recorded the amount of dilatation was very great, and was accompanied in most instances by hypertrophy

of the parietal tunics, especially of the muscular: in a few the opposite condition of atrophy and attenuation has been observed.

As we have already shewn, it may be met with as a congenital defect, and Albers believed that it was always of this nature. A sufficient number of cases have, however, been observed, the details of which go to prove, as we think, conclusively, that it may originate in after life. A case, bearing upon this question, and highly interesting both in its clinical history and in the pathological conditions found after death, was published by Hannay in the *Edinburgh Med. and Surg. Journal*, July, 1833 :—

"J.L., aged 38, had suffered from dysphagia from early boyhood. The commencement dated from the receipt of a violent blow on the chest. Ever since he had suffered from uneasiness in the epigastric region, and difficulty in swallowing; the morsel appearing to be arrested opposite a point a little above the lower end of the sternum, and giving rise to the most painful and protracted efforts of deglutition. The symptoms became gradually worse, and had lately amounted to an agonising sense of distension, which remained for several hours after each meal. Immediate relief could be obtained by vomiting. The passage of a probang met with no obstruction. He had of late complained of a constant sense of oppression in the chest, made worse by any violent exertion. His symptoms were always aggravated by any intemperance. . . . He was found dead one night in his chair, after walking home about two hours before from a supper party, where he had indulged rather freely in the good things of the table."

On examination, the œsophagus was found enormously dilated, and filled with ingesta :—

"The dilatation began immediately on its entrance into the chest. The cervical portion was perfectly natural. It gradually grew wider till it reached the middle of its course in the thorax. There the sac measured, as it lay collapsed on the table and unopened, rather more than three inches across; or when fully distended with fluid, more than six inches in circumference. The thoracic portion alone required above eight gills of water to fill it, and when so filled it looked like the arm of a person fifteen or sixteen years of age. From the middle of the thoracic portion it gradually diminished in capacity till it reached its appropriate aperture in the diaphragm, where it was of

its natural dimensions." . . . . "The parieties of the tube were several times their ordinary thickness, and, comparatively speaking, dense and strong; they had lost almost all trace of muscular texture; the appearance of a section of them reminded me of a piece of sole or thick leather. They had a good deal of blood in them and seemed very vascular. Its internal or mucous coat seemed very vascular, arborescent, and red; it was, as it were, spotted with abrasions of its cuticle, and felt rough and scabrous to the finger. Some parts were smooth, and being less red, appeared almost natural. There was no obstruction, either by tumour external to, or by constriction, within the canal."

In his remarks on this case, Hannay expresses his belief that the appearances above described were the result of repeated attacks of inflammation. The vascularity and swollen condition of the walls of the tube supported this view; so also did the symptoms which had been present during life: the painful sensations, the aggravation by any act of intemperance, &c. "The surface, abraded and irritable-looking, had all the appearance of recent inflammation." The explanation of the process of enlargement which he gives in concluding, appears to us to be quite satisfactory. "Repeated attacks of inflammation of the œsophagus had probably destroyed its muscular structure and its contractile power. Swallowing was impaired; the food was detained and accumulated; and the distension by the ingesta had by degrees mechanically dilated the canal." The first attack had probably followed the violence which the parts had sustained at the time of the receipt of the blow.

Rokitansky appears to have had the above case in his mind's eye when he says,[1] in speaking of dilatation, "It appears to be sometimes the consequence of concussion of the œsophagus by a blow or contusion of the chest." These words are, to say the least, very indefinite, and he does not trace the process any further. Niemeyer questions the explanation, but, like Rokitansky himself, does not seem to have considered the sequence of the changes to which the results of the application of such violence may give rise. Another theory of the origin of dilatation, which Niemeyer mentions only to

[1] Path. Anat. ii., 8.

condemn, is that of Oppolzer, who has attributed it in some cases to the treatment of gout by large quantities of warm water. We agree with Niemeyer in believing that the large quantities of warm water were not the real agents in producing this condition. But the patients who used these large quantities of water were gouty; had the gout anything to say to it? we would ask. We shall find that some gouty patients have been subject to repeated attacks of inflammation of the gullet; and we believe that one of the effects of repeated attacks of inflammation is an atonic state of the walls of the tube, in which it easily yields to pressure of any kind, whether of "large quantities of warm water" or of the usual ingesta. We consider this to be the probable etiology of the dilatation met with in connection with gout, but we have not sufficient data to prove our hypothesis.

A remarkable case of dilatation of the œsophagus, following the strain caused by lifting a heavy weight, has been recorded by Dr. Henry Davy:—[1]

The patient, a gentleman of 38, had given himself a severe strain in lifting a heavy weight, and felt as if something had given way inside. From that period he had suffered from difficulty in swallowing, and nausea and vomiting after taking food. If he attempted to lie on his left side he felt a smothering sensation, and soon threw up quantities of a slimy fluid, which was free from acidity or disagreeable taste. These symptoms gradually became more aggravated. When seen for the first time by Dr. Davy, he suffered from a feeling of "raking or tearing" in the epigastric region whenever he attempted to swallow. He also suffered from a sensation of heat and burning along the course of the œsophagus, and experienced an obstruction to the passage of food opposite the right margin of the ensiform cartilage. He vomited considerable quantities of slimy mucus, especially in the morning after sleep. "The sickness was in a great measure relieved by lying on the right side; his appetite was craving, and he suffered much from thirst." In the epigastrium there was felt a pulsation resembling that of aneurism. In this situation there was also considerable pain, and tenderness on pressure; and on percussion there was marked dulness. He was also suffering from obstinate constipation, and had a hard, dry cough.

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[1] *Dublin Hospital Gazette*, May 1, 1875.

Under treatment he recovered so well as to be able to resume his situation; and during the next five years the only inconvenience from which he suffered was that he was obliged to take his meals in a semi-recumbent position, with his right arm over the back of a chair, having found by experience that this was the only posture that would allow the passage of food into his stomach; in any other position he felt very uncomfortable, and experienced a smothering sensation that brought on a fit of coughing.

A sudden aggravation of his symptoms, like that for which he had been treated before by Dr. Davy, proved fatal, in about eleven days, from inanition: the stomach retaining no food.

On *post-mortem* examination the œsophagus was found "enormously dilated throughout its entire course, resembling the colon in appearance when distended with air, and measuring at its broadest part (the upper part of its lower third) nine inches, and through the rest of its circumference above and below about eight inches; its muscular coat was very much hypertrophied. The œsophagus was slightly distended with flatus, and contained about a wineglassful of a brown fluid like tea, which was prevented from entering the stomach by a twist or volvulus at its cardiac extremity, at its passage through the diaphragm. This circumstance, in my opinion, accounted for the facility with which Mr. R—— swallowed when he stretched himself, by undoing, so to speak, this twist. On filling the œsophagus with water, we found it was capable of holding two pints of fluid, and we observed that the mucous membrane was studded at the dilated part with several irregularly-shaped ulcers, varying in size from a pin's head to a two-shilling piece. We also perceived innumerable small white spots (cicatrices), the remains, no doubt, of old ulcers which had healed. The cardiac extremity of the œsophagus readily admitted the index and middle finger, and there was no indication of malignant disease, aneurism, or tumour."

It is remarkable that in neither of these cases did the general nutrition of the system seem to suffer so much as might have been expected from the nature of the symptoms.

Purton[1] recorded a case in which a man died exhausted from the effects of dysphagia, which had commenced in boyhood after the receipt of a violent blow on the sternum, and which had gone on increasing, though with intervals of comparative ease, up to the period of his death. The œsophagus was found dilated, and forming a sac which reached from two

[1] London Med. and Phys. Journal, xlvi., 540.

inches below the pharynx to the cardiac orifice. The interior of the sac presented, in a slight degree, the rugous appearance of the stomach.

Another case, more familiar to English readers than those we have mentioned, is that given by Mayo. A woman, aged

1. Larynx. 2. Trachea. 3. Thyroid body.
4. Œsophagus. 5. Stomach.

Plate IV. (copied from Virchow's Archiv., Bd. xlii., Taf. xi.), represents a case of enormous dilatation of the œsophagus, accompanied by neither narrowing nor compression of the cardia. The specimen was taken from the body of a woman of fifty, who had, from the age of fifteen, the power of vomiting at will. During the latter years of her life she had frequent vomitings of blood. The œsophagus was 46cm. in length, and 30cm. in circumference at the widest part. The muscular tunic was greatly hypertrophied. The mucous membrane seemed to have been the seat of acute catarrhal inflammation.

thirty-three, died in a state of extreme emaciation, brought on by the continual vomiting of food, which was always rejected a few minutes after being swallowed, and seemed to her never to reach the stomach, except when a large draught was taken, a portion of which was generally retained. After death the œsophagus was found enormously dilated, except about an inch and a-half of its pharyngeal and an inch of its cardiac end. The greatest breadth was four inches above the cardia, where it attained a diameter of two and a-half inches when distended. The symptoms had commenced ten years before during pregnancy.

II. The second class of cases—that in which the portion of the œsophagus affected is more limited, the dilated portion assuming the form of a pouch—is much more frequently met with than the one we have been just considering. It is usually the result of some obstruction in the course of the tube which prevents the free passage of the ingesta. The mechanism of its production under such circumstances is easily understood: the food being arrested in its course, accumulates above the seat of obstruction, and some part of the wall of the canal, weaker or less supported than the remainder, yields to the gradual pressure, just as happens under similar circumstances in the rectum and urethra. The forms of dilatation which are met with in cases of "œsophageal obstruction" will be fully considered when we come to deal with this part of the subject.

Cases are also on record in which this condition seemed to have been the result of the impaction of a foreign body in the gullet. The most striking, perhaps, is that recorded by Ludlow,[1] of which we subjoin a condensed account:—

"The patient, a brewer of about sixty, reduced to the last degree of emaciation, gave the following history of his case:—About five years before he had swallowed a cherry-stone which had stuck in his throat, from which it was expelled three days after during a strong fit of coughing. While the foreign body remained in the pharynx there had been some difficulty of deglutition, the pain which he experienced being attributed by the patient to the irritation which it had produced in its descent. After its expulsion, he felt for a long time considerable pain in the

[1] Med. Obs. and Inquiries, vol. iii.

place where the body had been lodged. About a year after, he began to observe that, an hour or two after a meal, part of the food returned into his mouth unchanged. The quantity which was brought up in this way gradually increased, while the period of time which elapsed between the meal and the occurrence of the regurgitation diminished, till at last the food returned while he was still at table. This now occurred so suddenly, especially when he drank, that he was sometimes nearly suffocated. At last he was unable to swallow more than about four spoonfuls till the aliments returned into the mouth by 'a process similar to that of rumination.' For thirty-six hours before he was seen for the first time by Ludlow, he had been unable to get any nutriment into the stomach. To sustain life under these circumstances, recourse was had to nutrient enemata, but he died thirteen days after in a state of exhaustion.

"On *post-mortem* examination an immense muscular sac was discovered, lying between the œsophagus and the vertebral column. It was inclined rather to the right of the middle line, and descended into the thorax, but had contracted no adhesions with any of the surrounding structures. A careful dissection showed that this pouch was formed by a dilatation of the posterior part of the pharynx, but the thickness and the structure of the pouch and of the pharynx corresponded so exactly, that it was impossible to say where the dilatation exactly began. The wall of the œsophagus was very much thinned where it lay in contact with the sac, and the opening by which it communicated with the pharynx was very much narrowed."

In his remarks on this case, Ludlow has no hesitation in expressing his belief that the presence of the cherry stone was the starting-point which determined the formation of the sac. He supposes that having become arrested in the mucous folds of the pharynx, and, being continually pressed upon by the bolus at each act of deglutition, it had at last formed for itself a cavity more or less adapted to its size, and which remained when the stone was rejected, after which it gradually increased by the pressure of the aliments which became lodged in it. But the real explanation of its origin must remain obscure, and it will still be a matter of uncertainty whether the theory offered by Ludlow be the true one, or whether, indeed, the pouch in question was not a congenital malformation, slight at first, but gradually increasing in size as it yielded to the pressure of the retained ingesta. For our own part, we confess that we cannot understand how even such a

body as a cherry-stone could remain in a pharynx of normal form for several days.[1]

Another case in which a pouch also existed, connected above with the posterior aspect of the lower end of the pharynx, and extending downwards between the œsophagus and spine for about six or seven fingers' breadth, has been observed by Gianella (cited by Mondiere, Archives Gen. de Medicine, t. xxiv., p. 411) :—

"The patient in this case died at the age of sixty, in a state of extreme emaciation, the result of dysphagia, from which he had suffered in a less degree from his youth, but which had for some time become so much aggravated, that no nutriment could be got into the stomach. Before it had taken on this severe form, he was able to get down his food by eating slowly, and aiding the descent of each morsel by making pressure on the front of the neck with his hand. At the autopsy, the superior opening of the œsophagus was found narrowed, and lying between that tube and the vertebral column a pouch extended downwards for about six or seven fingers' breadth. The widest part was where it communicated with the œsophagus."

In his remarks on this case he observes, "As soon as the aliments arrived at the constricted portion of the œsophagus, instead of following the natural route they descended into this pouch, in which they remained till rejected by a spasmodic contraction of its walls." When a sac of large size exists in this situation it gives rise to the symptoms of stricture: the retained ingesta compress the œsophagus, and effectually prevent deglutition.

Hankel[2] has recorded the case of a merchant, aged fifty-four, who died of inanition from dysphagia, which had commenced nine years before :—

"He had perceived once in eating that the morsel was suddenly arrested in the œsophagus. From that time he had always suffered from pain in swallowing. This went on increasing ; a portion of the

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[1] See also Holmes' "System," vol. ii., p. 523. Rokitansky, however, sanctions Ludlow's hypothesis.

[2] Rust's Magazine fur die gesammelte helikunde, 1833, quoted by Nelaton, Pathol. Chirurg, iii., 424.

food was rejected after each meal; he was obliged to re-chew it in order to swallow. After a meal also, there was found on each side of the larynx a large tumour, which could be emptied of its contents by pressure, part passing down into the stomach, and part returning into the mouth.

On examining the œsophagus after death, a diverticulum of considerable size was found springing from its upper extremity just beneath the inferior fibres of the pharyngeal constrictor. The opening by which it communicated with the œsophagus was of smaller dimensions than the tube itself; the sac was three inches and nine lines in length, and one inch and nine lines in breadth, its walls, which were pretty thick, were formed of the tunics of the œsophagus; the mucous coat was atrophied."

The sac, he observes, being soon filled by the ingesta at each meal, and finding a "point d'appui" on the vertebral column, compressed the œsophagus from behind, and closed it so as to effectually prevent the passage of food along that canal. Thus it was that this "lesion anatomique" determined the fatal issue.

Another case—in which the existence of a similar pouch springing from the upper extremity of the œsophagus had given rise to dysphagia, the cause of which had been unexplained during the patient's life—has been recorded by Coffin (Bulletin de la Societe Anatomique, 1847).

A specimen was exhibited to the Pathological Society of London by Mr. H. C. Johnson,[1] in which a pouch capable of holding a small orange was connected with the œsophagus on its posterior aspect, and on a level with the lower border of the cricoid cartilage. The patient had suffered from dysphagia, for which no cause could be assigned, and about two hours after meals a considerable portion of the food was ejected in the form of pellets. These had probably been formed in the pouch by the motion caused by the contractions of the tube. Blasius[2] has seen two examples of this form of dilatation of such exaggerated dimensions that the sac in each appeared to him like a second stomach.

III. With regard to the third form of dilatation—in which

[1] 21 Feb., 1848. [2] Observ. Anat., p. 120.

a sac is formed by a hernial protrusion of the mucous membrane of the œsophagus through its muscular coat—considerable difference of opinion has long existed among pathologists. Monro[1] long ago admitted it among the varieties of dilatation met with in this canal, but does not seem to have had any stronger reason for doing so than its analogy with what is sometimes seen in the intestines, and more especially in the bladder. He thought that in consequence of a strong spasmodic contraction of the muscular fibres of the œsophagus, the mucous membrane might form a hernia between their bundles, and that the pouch which originated in this way went on increasing indefinitely from the pressure of the ingesta which lodged in it. De Guise[2] also atrributed their origin to a hernia of the mucous membrane which took place during the act of deglutition; and he thought that this explained the fact that they are most frequently seen at the lower extremity of the pharynx and the adjacent portion of the œsophagus. He believed that he saw an instance occurring in a horse, but it does not appear from his account that he had made a careful dissection of the parts. Mondiere,[3] in the course of his elaborate researches on affections of the œsophagus, did not meet with a single well authenticated case of the kind. Cruveilhier, as the result of his own observation, concludes, with Monro, that hernial pouches are sometimes formed here, similar to those found in the rectum and bladder. A very good example of this pouch-like dilatation was exhibited to the London Pathological Society by Dr. Ogle.

The specimen was taken from the body of a man, *æt.* 63, who had died of pneumonia. He had suffered from difficulty of swallowing for many years before his death. When his meals were concluded, small portions of the food were wont to return into the fauces and mouth, and this would continue more or less for several hours. For two or three years before death he had been subject to attacks of laryngitis; from

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[1] Morbid. Anat. of the Gullet, Stomach, and Intestines.

[2] Dissert. sur l'aneurysme, &c.

[3] Archiv. gen. de Medicine, ii^e^, serie, iii., 29.

which, however, he had recovered. It had been supposed that a stricture of the œsophagus existed, but no treatment was ever adopted.

On *post-mortem* examination no stricture was found. The upper part of the pharynx was found to be enlarged, and its muscles greatly hypertrophied; while from the posterior wall of the canal corresponding to the lower border of the inferior

Plate V.

constrictor of the pharnyx sprang a pouch of about the size of a bantam's egg. The pouch only involved the posterior and lateral walls of the tube, and projected downwards behind the œsophagus, and was apparently composed of a portion of the mucous membrane and submucous tissue protruding through the muscular walls of the pharanx, and did not appear to contain any muscular fibres. (Microscopic examination afterwards showed their absence.) (Plate V. represents

a view of the parts from behind; the œsophagus and pharynx having been laid open. A piece of catheter is introduced to show the continuity of the tube.)

Sir Charles Bell gives the particulars of a case of this kind which came under his notice. Rokitansky, as we have already seen, classifies this form as one of the varieties of dilatation met with in the œsophagus, and it seems to be admitted by all the late writers on the subject. Habershon,[1] who has adopted Rokitansky's classification, also gives an instance which occurred at Guy's Hospital, in a patient who died there of peritonitis coming on from perforation of the ileum during typhoid fever:—

"At the commencement of the œsophagus was a pouch, half an inch in length, consisting of the mucous membrane, and very slightly covered at the neck with a few muscular bands; it was full of mucus." (Prep. 1784[2]). "This form is most frequently seen near the bifurcation of the trachea: it is found of largest size at the lower end of the pharynx."[2]

Causes.—Instances of the principal causes to which secondary dilatation of the œsophagus has been attributed have been given in the preceding cases. Inflammation following a blow, or straining, or the occurrence of a stricture low down in the tube, are the chief causes of the first class of cases. A stricture or other obstruction, arising high up in the canal, would be more likely to give rise to the second form. The arrest of a foreign body in the tube has also been assigned as a cause; but, as we have seen, some of the cases which have been accounted for in this way may have had a still remoter origin. Ludlow's explanation has been, however, accepted by Mondiere, Velpeau, &c.;[3] and the former gives the particulars of a case[4] illustrating the *modus operandi* of the foreign body in these

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[1] Diseases of the Abdomen. 2nd ed., p. 79.

[2] Rokitansky.

[3] *Vide* Rokitansky, Path. Anat., ii., 12.

[4] Arch. Gen. de Medicine, 1830, ii.° série, iii., 30.

cases—"*dans lequel la nature fut pour ainsi dire prise sur le fait:*"—

"A peasant, aged twenty, of robust constitution, swallowed during sleep a stone with which he had been amusing himself for some little time before by rolling it about in his mouth. . . . After awaking he felt severe pain in the chest, together with complete inability to swallow. . . . He died nine days after. On examining the body the œsophagus, stomach, and part of the intestines were found in a state of gangrene. The stone, '*etait en quelque sorte chatonnee*' in the lower part of the œsophagus, where it had formed a sac on the right side; this sac was corroded by the suppuration, so that a portion of the stone lay bare in the cavity of the thorax, beside the trachea."

Another species of obstruction to which Sir C. Bell[1] attributed the formation of pouches is a spasmodic contraction of the upper portion of the œsophagus, as a result of which the lower part of the pharynx forms a sac which hangs down behind the œsophagus. The same idea was also entertained by Monro.

Rokitansky[2] saw one instance in which the diverticulum was formed by the shrinking of an adherent tracheal gland, which in its contraction dragged out the mucous membrane along with it.

Paralysis of the walls of the tube is another condition which may give rise to dilatation. So may ulceration, either simple or specific, by weakening the parietes at any point, which then yield to the pressure of the ingesta.

Symptoms.—The most prominent, as well as the most constant symptom in the different forms of œsophageal dilatation, is regurgitation of food. This symptom, as was seen in some of the cases we have mentioned, sometimes almost amounts to a regular habit of "rumination." In regurgitation of food from the œsophagus the aliments are brought up mixed with a large quantity of mucus, and have no acid taste. The act is also performed without any effort or voluntary

[1] *Lancet*, xii., 706. [2] Path. Anat., ii., 8.

muscular movement, and is not preceded by nausea; all of which points serve to distinguish it from the ordinary gastric vomiting. Hiccup is a frequent accompaniment, and where pouches exist they are usually accompanied by extreme fœtor of the breath, from the decomposition of the retained aliments. When the dilatation occupies the cervical portion of the canal, a tumour may usually be detected on palpation. This tumour will be always increased in size after eating, when it is also capable of being reduced by pressure; a portion of the food returning into the mouth, while the remainder descends into the stomach. When occupying the thoracic portion of the gullet, the tumour so formed may give rise to any of the various pressure symptoms of a mediastinal tumour. When so placed as to compress the inferior portion of the tube, it will give rise to the same symptoms as stricture of the canal.

CHAPTER IV.

INFLAMMATION OF THE ŒSOPHAGUS: ŒSOPHAGITIS.

Inflammation of the œsophagus presents numerous varieties in its character, intensity, and also in the particular tissues of the canal which may be affected. Among the varieties of character which have been enumerated by writers on the subject, we find, in addition to the simple or catarrhal form, the croupous, the apthous, the pustular, the erysipelatous, the gangrenous. A follicular inflammation has been recognised in which the mucous follicles are alone affected, the mucous membrane remaining intact. Rheumatic and gouty inflammations have also been noticed. It may be acute, sub-acute, or chronic: the affection may be limited to the mucous membrane lining the canal (perhaps even to the follicles, the mucous membrane escaping, or being affected only in the immediate vicinity of the follicles), or it may extend through the sub-mucous tissue to the muscular tunics, and so engage the whole thickness of the walls of the tube.

Acute Œsophagitis (Catarrhal).—Acute catarrhal inflammation of the mucous membrane lining the œsophagus is a very rare affection. Habershon[1]—up to the date of publication of the second edition of his work—never saw a case of pure and simple inflammation attacking this part. The only instances he saw were those in which it co-existed with gastro-enteric inflammation. Mackintosh[2] saw one instance. Graves,[3] in his "Clinical Lectures," gives a solitary case. Catarrhal inflammation attacking this, as well as other mucous mem-

[1] Diseases of the Abdomen, 2nd ed. [2] "Pathology."
[3] *Vide* p. 60.

branes, is attended in the early stage with hyperæmia of the membrane, which is also dry and swollen. On examination it is found to be red and injected on the surface, the redness being either uniform, or, as is more usual, occurring in patches, with arborescent vessels ramifying around. The redness varies, according to the character and intensity of the inflammation, from a pale rose to a reddish brown, or livid tint. The secretion of the membrane, which was suspended during this early stage, is soon restored, "changed in quality and increased in quantity." There is abundant proliferation of epithelium, in consequence of which an immense quantity of thick and viscid mucus is formed, which sticks to the inner surface of the tube. At this period there is also œdema of the submucous tissue, produced by the weeping of the serum from the over-distended vessels. This condition combines with the swollen condition of the mucous membrane to diminish the calibre of the canal. The lymph which is exuded from the vessels takes no special part in the production of the pathological conditions which are present in the earlier stages; but at a later period, as we shall afterwards find, its presence is of the highest importance, especially in chronic cases. The swelling in the earlier stage is due to the distension of the blood-vessels; later on it is increased by the œdema. The effusion is of a sero-sanguineous nature in severe cases. In addition to the swollen and hyperæmic condition of the mucous membrane, there are nearly always found patches of softening, over which the epithelium is either altogether destroyed, or is partially separated, and hangs in loose shreds, while the basement membrane and submucous tissue are reduced to the condition of a pulpy material, which can be easily wiped away. (This destruction of epithelium is especially seen in infants.)[1] It occurs when the inflammatory process is very severe; the proliferation of cells being then so rapid that the ill-developed new cells are loose, and fall off very easily. (It is this process which, when very rapid, leads to the formation of ulcers.)

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[1] Mondiere, Archiv. Gen. de Med., t. xxiv., p. 561 *et seq.*

Causes.—A long list of causes will be found enumerated by writers on the subject, to which the occurrence of inflammation of the œsophagus has been attributable in different cases. They may be divided into the *predisposing* and the *exciting*.

The predisposing causes are: infancy and childhood, long-continued dyspepsia, constipation, abuse of spirituous liquors, scrofula, gout, rheumatism, plethora; also, it is said, the habit of wearing too warm clothing around the neck and throat, and the use of tightly-laced corsets. The most frequent exciting causes are: the swallowing of acrid or corrosive substances, also of too warm fluids or substances; or, on the other hand, of draughts of cold liquids when the body is over-heated or perspiring; ingestion of ices under similar circumstances; deglutition of very large mouthfuls, or of hard irritating bodies; abuse of irritating medicines, as mercury,[1] iodine,[2] ammonia, squills, ammoniacum, opium.[3] Œsophagitis may also be the result of exposure of the neck and chest (this is more likely to be seen in females); of the use of highly-seasoned or spiced articles of food; of the action of certain animal poisons, especially those developed in preserved or smoked meats, mushrooms, &c.; of an unhealthy state of the milk of nurses, or even of sore nipples. It has sometimes followed the exhibition of acrid emetics. The irritation resulting from the presence of a foreign body is a frequent cause, also, we may add—bungling attempts to remove foreign bodies. It is occasionally the result of an awkward use of the bougie, or stomach-pump. It has been known to follow the suppression of accustomed secretions or discharges, and the disappearance of cutaneous eruptions. It occasionally results from external injury (contusions, wounds, &c.), and is sometimes propagated by extension from adjacent parts. Long-continued spasm of the muscular walls of the tube has been set down as an exciting cause of œsophagitis by some,[4] but is entirely denied by others. It is

[1] Pildenbrand Inst. Just. Med. Pract.
[2] Zink de Lausanne, Jour. Compl. xviii., 132.
[3] Gohier, Jour. Univ. R., 237.
[4] Baillie, Morbid Anat., 5th ed., p 104; Percival, Med. Trans., ii., 90; Barras, Traite des Gastralgies.

much more probable, as seems to us, that the inflammation was the primary affection in such cases, and provoked the spasmodic contraction of the muscular fibres, which was then the most prominent symptom.

Cullen mentions a case of erysipelatous inflammation which engaged the whole length of the alimentary canal from the mouth to the anus. Mondiere[1] has recorded a similar case.

Symptoms.—The symptoms present in œsophagitis vary very much in different cases. The most constant, as well as the most characteristic, are—a sensation of heat and dryness in the part, pain, vomiting, thirst, hiccup, spasm, expuition of glairy mucus, a sensation of a ball at some point in the course of the canal, and difficulty (sometimes amounting to impossibility) of deglutition. We shall proceed to examine these symptoms in detail.

Pain, accompanied, and often preceded, by a sense of heat and dryness—referred to some point along the course of the canal—is the most constant symptom. The pain, slight at first, rapidly increases in severity. It is increased by speaking or swallowing, and becomes excessive when the bolus passes over the inflamed surface: in some cases it is perceived only at that moment. It may be so acute that the patient avoids drinking although tormented by thirst. Usually its position is fixed, but in some cases it may travel along the whole length of the canal occupying different points in succession. "Dès le debut de l'inflammation, quelle que soit la partie de l'œsophage qui en soit le siége, la douleur est rapportée par les malades à la partie inférieure du pharynx, sensation qui se rapprochu de celle qu'eprouvent à l'extrémité de la verge les individus affectés de blenorrhagie ou de calcul vesical." (Velpeau, Dict. de Med., Art. Œsophage.) This peculiarity of the pain was well exemplified in a case recorded by Noverre.[2] The same peculiarity of the pain was experienced by Mondiere when suffering from this affection: "La

[1] Arch. Gen. de Med., xiv., 536.

[2] Bullet. de la Fac. de Med. de Paris, vi., 1819.

douleur, fixée pendant quelques jours vers la partie supérieure du cou, à la hauteur du larynx, se fit de jour en jour sentir plus bas, parcourit ainsi toute l'étendue de l'œsophage, se fixa quelque temps dans un point correspondant à la partie inférieure du sternum, et disparût enfin vers le dixième jour."

Sometimes the pain is felt chiefly at the larynx, or between the shoulders, or in the epigastrium. In a case recorded by M. Roche,[1] pressure exercised immediately below the ensiform cartilage gave rise to the sensation of a body which ascended from that point into the neck, and also of a dull pain which stretched like a cord from one of these points to the other. M. Broussais[2] met with a case of œsophagitis in which the patient had the sensation of a ball which ascended from the epigastric region towards the larynx, where it stopped.

Hiccup is present in a large proportion of cases of inflammation as well as in other affections of the œsophagus. Its connection with œsophagitis was long ago observed by Van Swieten and Hoffmann, who noticed that it often accompanied the presence of aphthæ in the œsophagus before they appeared in the pharynx or mouth.

Spasm of its muscular tunic frequently accompanies inflammation of the œsophagus. Sometimes it is continuous, at other times it only manifests itself when the patient tries to swallow. Liquids excite spasm much more surely and more forcibly than solid matters ; so much so, that when the former come into contact with the inflamed surface they are rejected with a convulsive movement through the mouth and nostrils, when the tendency to spasm is well marked.

Expuition of a glairy mucus in greater or less quantity is always present in œsophagitis, especially when the inflammation has engaged, at the same time as the mucous membrane, the follicles which open on its surface. (Mondiere, Velpeau.) Mondiere[3] tells us that this symptom was present in his own case, and that, towards the end of the disease, the rejected

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[1] Dict. de Med. *et.* Chirurg. Pratiques, Art. Œsophage.

[2] Annates, iii., 254.

[3] Archiv. Gen. de Med., xxiv., 548 *et seq.*

matters became more ropy and of thicker consistence. The amount is also increased by the addition of the saliva, which, in severe cases, the patient allows to dribble from the mouth rather than expose himself to the torture experienced during each effort of deglutition.

Difficulty of deglutition is partly owing to the mechanical obstruction produced by the narrowing of the calibre of the tube, which is consequent upon the tumefaction and œdema of the mucous membrane and submucous areolar tissue; and much more to the pain and spasm which is brought on by every repetition of the act. The pain experienced is sometimes so intense, that the patient, although tormented by the most intense thirst, refuses to drink, from dread of the torture which he knows from experience would follow an attempt of swallowing. The deglutition of liquids, as we have already mentioned, is still more difficult than that of solids; the former being in the severer cases forcibly ejected through the nostrils with a convulsive movement, which is sometimes followed by a violent and suffocative fit of coughing, due probably to a portion of the fluid finding its way into the larynx. The more solid ingesta, on the other hand, usually pass down without difficulty till they get within the inflamed portion of the tube, which contracts spasmodically upon them, giving rise to severe pain, which is usually referred to the interscapular region. On the remission of the spasm the bolus may either pass onwards into the stomach, or be rejected by the mouth. When the latter takes place it is usually followed by a considerable quantity of mucus, which is sometimes streaked with blood.

A curious symptom observed by M. Renauldin[1] is a sensation as if the bolus in swallowing took a direction different to that of the œsophagus.

In addition to the special symptoms enumerated above, there are the ordinary symptoms of symptomatic fever, but these are seldom well marked. The fauces and pharynx are generally injected. Tenderness may be discovered externally

[1] Dict. Abrégé, Art. Œsophagite.

on deep pressure, and in some cases there has been swelling of either side of the neck. Cough is sometimes present.

In infants the diagnosis is more obscure. Vomiting is more frequent than in the adult, and hiccup nearly always exists. The infant refuses to drink, or drinks but a little, which is soon rejected, without acid reaction, or other appearance of digestive change.

Terminations.—The most favourable termination of this as well as of other inflammations is, of course, *resolution*. In the course of this process the capillary stasis ceases to exist, the circulation becomes completely re-established, the dilated vessels shrink to their original dimensions, the blood once more courses through them in proper quantity and with normal velocity, the inflammatory products which had infiltrated the surrounding tissues become absorbed, and all is well again. This is the usual termination of a case of acute œsophagitis occurring idiopathically. Various other terminations may result from cases arising from injury, or from any of the various other forms of irritation which we have enumerated; but in a large proportion of these cases, too, the inflammation may end in resolution. The following example of a favourable termination is from Dr. Graves[1]:—

"Feb. 24, 1835.—For some days I felt as if I had caught cold with something like sore throat. I felt as if the root of the tongue at the left side was sore. By degrees this extended downwards; a ring about the lowest part of the throat became painful on swallowing. The pain was most sensible on the left side.

"Feb. 26.—I took a bit of bread before dinner, and, on attempting to swallow, I perceived great pain from the commencement of the throat, proceeding downwards towards the chest, as if the bread was then impeded by something, and from thence it seemed to proceed with increased pain to the back between the shoulders. I felt no want of appetite at dinner, but the attempt to swallow caused considerable pain. The night was passed in a state of great restlessness, and with headache; violent pain sometimes seized me on some little change of position, as it does in lumbago. The pain then seemed to affect the

[1] Clin. Lect.

whole chest, and, extending to the back, caused a hot, burning sensation directly between the shoulders.

"Feb. 27.—On attempting to swallow I felt such pain as to force me to cry out, as if the entire passage from the throat to the stomach was inflamed, and that everything, whether fluid or solid, had to force its way painfully through the passage. In swallowing, it seemed doubtful whether the food could proceed."

Such is the patient's own account of his condition. Dr. Graves adds, that on the 28th the inflammation had evidently begun to diminish, and had altogether disappeared in the course of a few days under treatment. "There was no redness to be seen in that part of the throat which is visible when the mouth is opened."

Mondiere's case, as described by himself, we have already alluded to, with its peculiar form of pain and profuse mucous discharge. The pain had disappeared about the tenth day. "Je restai quatre jours sans pouvoir avaler ni solides, ni liquides; je trompais ma soif en tenant de l'eau fraiche dans la bouche ou en sucant de l'orange, et lorsque, vaincu par le besoin, j'essayai d'avaler une simple cuillerée de liquide, j'eprouvai, dans le point de l'œsophage actuellement enflammé, une sensation de brûlure und de dechirement dont il est difficile de se faire une idée. Vers le cinquième jour, je ne ressenti plus qu' une douleur supportable, mais long-temps encore je fus obligé de prendre les alimens presque froids."

These cases may be taken as types of this affection ending without further complication. We shall now proceed to consider the other terminations of a case of acute œsophagitis.

Suppuration.—Suppuration following catarrhal inflammation of the œsophagus occurs in one of two forms: (1) where the pus is formed on the internal surface of the mucous membrane;[1] (2) where an abscess is formed in the sub-

[1] In this form, according to Rindfleisch, the mucous membrane is not destroyed, but the pus is produced partly by endogenous proliferation of the superficial epithelium, and to a less degree by the subepithelial embryonic tissue elements, which make their way to the surface between the epithelial cells.—Path. Histology, i., 412.

mucous areolar tissue. The first form is rare, and only follows the contact of very irritating substances. A case of this kind is mentioned in Copland's Dictionary. The patient, a robust young man, had attempted to poison himself with laudanum. Mustard and warm water was given, which emptied the stomach effectually, but was followed in the course of two or three days by a most copious purulent discharge, which was brought up from the œsophagus by regurgitation. The patient recovered without any bad consequences resulting.

The second form is not so rare. It is most likely to follow an intense inflammation when limited to a small extent of the canal. It is also more likely to occur in patients of scrofulous habit when the inflammatory attack has been neglected. Mondiere believed that it would be found to occur more frequently if, when the abscess burst, the pus was not swallowed or rejected by the patient without his knowledge. The formation of an abscess may be inferred from the increased difficulty (often amounting to complete impossibility) of deglutition, with a sense of fulness and throbbing pain in the affected part, accompanied probably by rigors, and other symptoms of hectic fever, in a greater or less degree. In most of the cases on record the abscess has burst into the canal, either spontaneously, or upon the introduction of a bougie or probang, the evacuation of the pus being followed by instant relief to the patient. Mondiere[1] relates the following case :—

"A man aged forty, travelling in the great heat of summer, and oppressed by thirst, drank greedily of some water fresh from the spring. In the evening, difficulty of swallowing, accompanied by pain, came on; the food was arrested at the level of the second piece of the sternum, and was soon after rejected. For the next six days he continued to suffer without seeking medical aid, but at the end of that time, being tormented by the difficulty he experienced in deglutition, he consulted M. Bourguet, who found that he constantly rejected his food a short time after swallowing. There was no swelling visible externally. Having employed bloodlettings, leeching, &c., without success, M. Bourguet determined to explore the œsophagus with a

[1] From the *Gazette de Sante*, 1823, p. 221.

wax bougie, having an olive-shaped point. The instrument was not able to pass the spot where the patient felt the pain, and where he felt that the food was arrested. The operator employed a little force, overcame the obstacle, and passed the instrument on into the stomach. He withdrew the bougie, and with it a teaspoonful of pus. From that time the patient felt no considerable difficulty in swallowing, and was soon completely cured."

A case still more interesting, both from the very unusual cause to which it appeared to be traceable, and the very serious symptoms which were developed in the course of the affection, was read before the Académie de Medecine (1825), by M. Barras[1] :—

"The patient, a robust man, during a violent fit of passion made some great muscular efforts. Three days after he complained of severe pain by the side of the larynx, and of inability to swallow even liquids. The application of twenty leeches brought no relief, the symptoms became still more aggravated, deglutition altogether impossible, and from that time appeared violent thirst, acute pain in the neck, restlessness, convulsions, and all the symptoms of acute cerebral congestion. Venesection was twice performed, but it was only by the application of forty leeches to the neck, and the exhibition of powerful derivative medicines that the symptoms were relieved. On the sixth day they tried, without success, to introduce a sound ; it was arrested at the lower end of the pharynx. . . . On the seventh day, the patient, suddenly and without effort, brought up four spoonfuls of a thick, sanious, and extremely fetid pus. This discharge of pus by the mouth lasted for fifteen days ; deglutition was gradually restored, and at the end of a month the cure was complete."

The Commissioners appointed by the Academy to report on this case, regarded the cause of the formation of the abscess as probably due to rupture of some of the muscular fibres of the œsophagus occurring during the violent muscular efforts which he had indulged in. Mondiere objects to this conclusion on the following grounds : (1) the extreme rarity of rupture of the œsophagus under any circumstances ; (2) the fact it was only three days later that the symptoms began to show themselves. He does not, however, offer any satisfactory explanation of his own instead.

[1] Archiv. Gen. de Med. i., 531.

Abscess may also form as the result of the acute inflammation caused by the contact of strong acids or corrosive substances.

The abscess usually bursts into the tube, either spontaneously during deglutition or vomiting, or it may be ruptured by the passage of a bougie.

Ulceration.—Ulceration not unfrequently follows inflammation of the œsophagus. According to the observations of M. Billard,[1] it may even occur in intra-uterine life. He met with one instance in an infant who died thirty-six hours after birth. There were two ulcers situated in the upper part of the œsophagus, each three or four lines in length. He also found an ulcer towards the cardiac extremity of the œsophagus of an infant who died six days after birth. During life it had suffered from frequent regurgitations, vomiting of a glairy mucus, and afterwards of a thin green liquid. J. B. Paletta[2] has recorded a fatal case in which an ulcer of very large dimensions was found on the anterior wall a little below the level of the larynx. The mucous membrane alone was affected, the subjacent part of the muscular coat was hypertrophied. The patient, a country girl of 20, and previously healthy, had succumbed after a month's illness. She had complained of acute pain in the neck, accompanied by difficulty of respiration and of deglutition. Swelling on both sides of the neck was visible externally, and during the course of her illness she had expectorated a large quantity of purulent matter in the form of rounded pellets.

The symptoms[3] which accompany ulceration are those of simple œsophagitis, but in a much more aggravated form. The pain is more acute, especially during the act of deglutition. Mondiere mentions the case of one of his colleagues, M. Robouam, who perished of this affection, and who complained during the whole course of his illness (which lasted

[1] Maladies des Nouveaux-nés. Paris, 1828.

[2] Exercit., path., p. 228 (1820).

[3] An excellent analysis of the symptoms of ulceration, by Dr. Gordon, will be found in a later part of this Essay.

four months) of a feeling as if a red-hot iron were continually applied over the affected part. The ulcer was situated near the cardiac end. There is always vomiting of a glairy mucus, which is sometimes stained with blood. Solid food can only be swallowed with extreme difficulty and pain, if at all; liquids can usually be got down, if taken in small quantity, and swallowed with caution. Salivation is a frequent symptom, especially, it is said, when the upper part of the tube is engaged. There is usually expectoration of purulent matter in the form of rounded pellets: this has been also observed in cases of cancerous ulcer.

The most frequent seat of ulceration is said to be the posterior wall of the tube at its upper part. Several ulcers are sometimes found. The floor of the ulcer may be formed by the submucous areolar tissue, or by the muscular coat. Perforation is not a result of this form of ulceration, so far as we know.

Gangrene.—This is a rare termination of œsophagitis. It sometimes follows the impaction of foreign bodies. We have already seen one instance of this. Other examples will be given in the chapter on "foreign bodies." In this, as in other tissues of the body, gangrene follows inflammation, when the latter is so severe as to arrest completely the circulation in the part affected. The capillary stasis in those cases is so complete, and the pressure exercised on the surrounding tissues by the effused serum so great, that the nutritive processes can no longer be carried on, and the parts die *en masse*.

This result is only seen in cases where the nervous system is greatly depressed, as in low fevers: an example of this has been recorded by Duges.[1] The special action of some deleterious agent may sometimes determine its occurrence: thus Orfila[2] found the œsophagus in a state of gangrene in a person who had been poisoned by eating mushrooms. Some-

[1] Nature de la fièvre, ii., 432. [2] Mèd. lèg., iii., 339.

times, on the other hand, there can be no reasonable cause assigned, as in the following case :—

"[1]A man of sixty, having had some rigors and wandering pains in the back of the neck and in the throat, began to suffer from dyspnœa, and presented some tumefaction on the front and sides of the neck : the application of leeches, followed by poulticing, relieved it at the time, but, three days after, he again complained of pain in the back of the throat, accompanied by thirst, anoxexia, and difficulty of deglutition, although there were no visible appearances of inflammation. The neck was swollen, and the larynx was tender on pressure ; the pulse was small, feeble, and intermittent ; the tongue, dry and foul ; the attack was attended by great prostration, and the patient succumbed on the eleventh day.

"On examination the œsophagus was found to be gangrenous from its upper extremity to within an inch of the cardiac orifice of the stomach. The whole thickness of the walls was engaged, but especially the internal surface."

In the above case, so far as we can judge from the imperfect history, the case must have been one of simple idiopathic inflammation, followed by gangrene. Billard[2] has recorded the following more interesting case :—

"An infant, aged sixteen months, was admitted into the infirmary for a *herpes labialis*, which came on after a very mild attack of measles. Some days afterwards vomiting set in, which continued to be repeated at rather frequent intervals, especially after taking food. It was accompanied by a state of prostration, without any cries or complaints ; complete aversion to food, acid eructations, a small and slow pulse, and general pallor of the surface. These symptoms continued for some time, but towards the end of life the vomiting became less frequent, and the vomited matters consisted of mucus mingled with whitish flocculi ; the pulse, small and feeble throughout, became somewhat accelerated ; a little later the vomiting ceased, the eructations only remaining ; emaciation rapidly increased, and the patient died without any symptoms more marked than those which we have indicated.

"On examining the body after death the mouth was found healthy, but grayish softened patches were found on the pillars of the fauces, around the opening of the glottis, and along the whole length of the

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[1] (Quoted by Mondiere, Arch. Gen. de Med. xxiv. 564.) Journal de Leroux, Boyer et Corvisart, xix., 320.

[2] Op. cit.

œsophagus. These patches were surrounded by a margin of a vivid red colour. The mucous membrane of the œsophagus was covered with large irregular eschars of the colour of soot, and separating in shreds ; and between them the intervening portions of the membrane remained of a vivid red tint, but traversed by excoriations so deep as to penetrate through nearly the whole depth of the walls of the tube, and exhaling a well-marked odour of gangrene. The stomach presented merely some streaks of red."

Symptoms.—The symptoms indicating the supervention of gangrene of the œsophagus would be: the fever assuming a typhoid character ; continual eructation of fœtid gases ; with a gangrenous odour from the breath. According to Mondiere, vomiting (frequent in the inflammatory stage) ceases, the œsophagus being unable to contract.

Chronic Œsophagitis.—Chronic catarrhal inflammation of the lining membrane of the œsophagus, is, as we have said, a not unfrequent termination of the acute form, but it occurs still oftener as a primary affection.

The changes produced in the membrane in the chronic form of inflammation differ in all the principal features from those present in the acute.

Hyperæmia is present as in the other, but, from the long continued distension of the vessels, they present a varicose appearance, and the red colour approaches a livid or brownish tint. The secretion is usually excessive, and consists of an opaque viscid mucus, of a grayish, yellowish-gray, or milky appearance—" a blenorrhœa, which may or may not be attended with an exuberant formation of epithelium, and in which, accordingly, the epithelium is either rapidly thrown off, from an almost bare, and, as it seems, excoriated mucous membrane, or accumulates over the whole, or over parts, of the surface, and thus forms a complete laminated covering for it, or patches of various thickness here and there upon it.[1] Swelling is also marked, but in this form it is due principally to tumefaction of the mucous membrane itself—which after a time becomes permanently hypertrophied—and in a much

[1] Rokitansky, Path. Anat., iii., 51.

less degree to an increase of fluid in the meshes of the submucous areolar tissue, consequent upon the increased determination of blood to the parts. At a more advanced period the submucous tissue itself becomes hypertrophied, as well from the permanent increase of the quantity of fluids arriving in it as from the inflammatory process itself. The mucous membrane is of a consistence tougher and more resisting than natural, and is separated with greater difficulty from the subjacent areolar tissue, owing to the increased density of the latter. This thickening of the mucous and submucous layers of the tube leads, after the lapse of some time, to more or less atrophy of the muscular coat.

"The fleshy thickening of the catarrhal mucous membrane was due, in no small measure, to the infiltration of the subepithelial connective tissue with corpuscular elements. All these cells must be removed before the mucous membrane can be said to have returned to its normal state. Some of them undergo fatty degeneration; others may be taken up by the lymphatics. But weeks may elapse before this is effected: and during the interval the mucous membrane offers a diminished capacity of resistance to fresh sources of irritation. For the irritability of an organ is proportional to the number of elements capable of irritation which it contains. This is not always sufficiently remembered either by the physician or his patient. The latter is in much the same position as a person whose mucous membranes are predisposed to catarrhal inflammation by a passive hyperæmia. There is always a risk lest the catarrh should return on the slighest provocation, and that in exactly the same part which it has apparently forsaken. The relapse is usually more obstinate than the primary disease; the vulnerability of the mucous membrane, and the consequent risk of a fresh relapse, increases and lasts for a longer time after every recurrence of the inflammation. Every relapse adds to the number of cells in the connective tissue of the mucosa; the epithelium, too, and the glandular apparatus, come gradually to take part in the chronic thickening; the mucous membrane becomes hypertrophied. Hypertrophy viewed in this light is therefore a result of catarrh; it may also be regarded as a structural cause which predisposes to catarrh, inasmuch as the phenomena which, taken together, constitute catarrh—*sc.* hyperæmia, swelling, hyper-secretion—have already reached a certain pitch, at which they have become stationary; so that a very trifling provocation suffices to raise them to the level of catarrhal inflammation."[1]

[1] Rindfleisch.

The above quotation describes, in the language of a learned German pathologist, the state of things which is to be found where a mucous membrane has been for some time the seat of a chronic catarrhal inflammation, and it applies to the mucous membrane under consideration as well as to any other. According to the same writer the epithelium is still continuous over the surface, as it was in the healthy state. "The hypertrophied membrane itself is pale, or more commonly, of a rusty brown, or slate gray, and after a time, of a dark blue colour; it is thick, compact, and firm; when uniform in thickness its surface is smooth; sometimes from the great increase in size of its papillæ and follicles it is warty and rugged; and lastly, even various duplicatures and prolongations may be formed upon it." [1]

Causes.—The chronic form of inflammation of the œsophagus, when not directly a sequel of the acute, is usually due to similar causes; it being only necessary that the irritation should be less severe at first, but often repeated, or perhaps continuous, as in cases of impaction of foreign bodies, where the injury caused by their presence has not been sufficiently severe to bring on an acute attack.

It is frequently an accompaniment of long-continued severe dyspepsia. It is more likely to follow the acute variety in patients of a strumous or gouty diathesis. It is often caused by the too early use of stimulating food after an acute attack; also by the injudicious use of tonic medicines or astringent gargles. Michaelis has shown that the abuse of ardent spirits is one of the most frequent causes.[2]

Symptoms.—The symptoms present in cases of chronic œsophagitis are similar to those of the acute variety of the disease, but in a much milder form, so much so indeed, that they are seldom brought under the notice of the physician till serious changes of an irremediable nature have taken place in the walls of the tube.

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[1] Rokitansky, loc. cit., iii., 32.

[2] *Vide* Jour. der Pr. Heilkunde, 1812, p. 52.

It is always attended by a copious discharge of viscid mucus. There are frequent eructations, and the patient is tormented with repeated attacks of hiccup. There is usually a short cough, and frequent hawking, from the difficulty of getting up the ropy mucus. Pyrosis is an occasional accompaniment, and the patient complains of wandering pains in the region of the gullet, especially about its upper end, with sometimes a feeling of soreness and sense of constriction.

Terminations.—*Hypertrophy* and thickening of the mucous membrane and sub-mucous areolar tissue is, as we have already seen, an almost constant result of chronic inflammation. The changes which the tissues undergo during this process have also been discussed. The abnormal development of the lowly organised tissue which is formed under these circumstances, leads to a gradual atrophy of the muscular coats of the œsophagus from pressure, and the consequent interruption to nutrition. The tube then loses its contractile power, more or less, according to the extent of the change which has taken place. Dysphagia, more or less marked, is the direct result. The walls of the canal in their atonic condition lose the power of propelling the alimentary bolus, while they more easily yield to its pressure, and *dilatation* is a frequent result.

Polypi are something formed by an extreme hypertrophy of the papillæ of the mucous membrane. When the hypertrophy is less marked, it gives rise to a rugged or warty appearance of the internal surface of the membrane. The following is Rokitansky's description of a mucous polypus, with its structure, and the process of its growth :—

"These polypi are processes of the mucous membrane of various thickness and length. In shape they are spheroidal or elongated, or like nine-pins or cylinders ; and their free extremity is thick and blunted. The mucous membrane and the tissue beneath it becoming hypertrophied at particular round circumscribed spots, form a somewhat flattened convex tumour, and progressively change into a honeycombed cellular tissue. Little by little the tumour drops into the cavity of the organ, dragging with it the surrounding mucous membrane, which contains a cord of sub-mucous tissue, and of a truncated

extremity or knob, at which the tissue proceeds to form itself into a honeycombed cluster of vesicles and follicles, and becomes lobulated like a cauliflower; it presents a system of dilated capillary vessels; now and then it becomes turgid; it secretes a jelly-like mucus in its interstices, and when that is discharged, it shrinks."

According to Rindfleisch[1] the main bulk of the polypus is made up of hypertrophied glands, whose tubes are filled with concentrically laminated masses of viscid mucus. They are lined with well-formed columnar epithelium. The pedicle is chiefly made up of the afferent and efferent vessels; no nerves have hitherto been found in it. Besides the mucous glands we find a certain amount of soft connective tissue, rich in cells, which is dense and fibrous only in the pedicle, and the bands which radiate from it. "We accordingly take it for granted that mucous polypi originate in a circumscribed hypertrophy of the mucous membrane, which mainly involves its glandular elements." The theory of Frerichs, which has been adopted by Middeldorpf, also ascribes them to obstruction and hypertrophy of the mucous glands.

Polypi of the œsophagus are very rarely met with; they are of much more frequent occurrence in the pharynx. Baillie[2] mentions one case which he saw: the polypus was of fibrous texture, and its fibres at right angles to those from which it sprang; its surface was ulcerated. Schneider[3] recorded a case in which three polypi were found in the œsophagus after death. They were attached to the mucous membrane, two of them by a narrow pedicle; one by a broad base. Their existence had not been suspected during life. De Graef[4] has given the particulars of a case of a man who indulged very much in tobacco and wine, and who, after repeated attacks of inflammation of the fauces and tonsils, began to suffer from dysphagia. At first the food only met with some interruption in its descent, and, after a little delay, passed on into the stomach. The dysphagia gradually increased, and after some

[1] Loc cit. i., 420.
[2] Morbid Anatomy.
[3] Chirurg. Geschichte, 1784.
[4] De callosa excrescentia. &c.

time the food, instead of passing on was, after being stopped for a time, rejected with great pain and a feeling of suffocation. The patient at last died of exhaustion. After death a polypus was found springing from the mucous membrane of the œsophagus, and completely blocking up the canal. It was about an inch in length, and of a conical form, the summit of the cone being directed towards the cardia: it was of a firm consistence and whitish colour. Pringle relates a precisely similar case, in which the polypus grew from the middle of the tube. A very interesting case of polypus of the œsophagus, which led to a fatal termination, will be found in the "Medico-Chirurgical Transactions," vol. xxx. The difficulty of swallowing commenced about four months before death, after a violent attack of vomiting, which he attributed to food which disagreed with him. From that time it gradually increased, and every act of deglutition was followed by severe cough, which also tormented him in the intervals: it was attended by a frothy expectoration, pain, but no dyspnœa. After some weeks the fever subsided, but the dysphagia progressively increased. By this time the only position in which he could swallow was by lying decumbent, and then throwing the head back. . . . For eight or nine days before death he never swallowed anything, yet he vomited bitter yellow fluid occasionally, which passed upwards without unusual difficulty. On *post-mortem* examination, a polypus was discovered at the commencement of the œsophagus, immediately behind the glottis. It was "lobulated, freely mobile, of a sub-livid colour and cellular texture, and about two inches in length at the periphery. In bulk it was somewhat larger than a walnut, and was attached to the mucous tissue by a short, thinnish fibrous base, commencing about half an inch from the posterior commissure of the glottis, and extending for the same distance in a straight line in the axis of the œsophagus. This fibrous attachment extended laterally also for about three-quarters of an inch towards the right, in a direction between the hyoid bone and thyroid cartilage. The structure of the tumour was vascular and homogeneous. . . . Another smaller tumour of very white colour, about three-quarters of an inch long, and

attached by a broad base, was found nearly two inches lower down the œsophagus."

Symptoms.—The symptoms which are produced by the presence of polypi in the interior of the gullet present nothing special or characteristic. Inasmuch as they are secondary in their origin to a chronic inflammatory state of the lining membrane of the tube, their growth will be generally found to have been preceded by some of the symptoms which we have described as accompanying that condition. As the growth proceeds, they give rise to a gradually increasing difficulty of deglutition, and at length to complete obstruction, as the polypus in its gradual development at length comes to block up the entire calibre of the tube. There is no certain means of diagnosis except where the growth can be seen or felt. When situated high up in the tube, it may perhaps be felt with the point of the finger, or seen by the aid of the laryngoscope. An interesting case, in which the presence of the polypus was demonstrated without the necessity of having recourse to either of these modes of examination, is recorded by Monro :[1]—

"James Davidson, æt. fifty-eight, was admitted into hospital for polypus of the œsophagus. On examination of the neck, nothing peculiar was discovered; but on irritating the pharynx, and in this way producing efforts of vomiting, a long fleshy excrescence appeared in the mouth, and even came so far forward as to touch the teeth; it was formed of four parts, which were united at their base; it was also of firm texture, fleshy, and very elastic. When the polypus appeared in this manner externally it completely closed the opening of the larynx, so that the patient could not allow it to remain in that situation for more than half a minute or so. For many years this polypoid excrescence had caused a difficulty in deglutition, and had also somewhat embarrassed the respiratory act. Articulation was less distinct than natural, and the patient was often attacked with fits of spasmodic cough, which forced the polypus to appear in the buccal cavity."

In this case a ligature was placed around the growth as far down as the operator could reach; tracheotomy having been

[1] Loc. cit., 426.

previously performed to allow the patient to respire freely during the procedure. A considerable portion of the tumour was separated, and passed off with the stools. . . . Two years after the patient again presented himself at the hospital: he was feeble and emaciated. For many months he had been unable to swallow any kind of solid food, and lately even liquids were got down with considerable difficulty. He died soon after his second entrance into the hospital. At the *post-mortem* examination "the œsophagus was found distended by a fleshy mass of polypus, which sprang from its anterior wall, three inches below the glottis. It divided into two parts, of which the longer reached the cardia."

Degeneration.—Degeneration of the walls of the œsophagus is a not infrequent result of chronic inflammation. Besides the fibroid form of degeneration, which we have already seen to take place in consequence of chronic catarrh of the mucous membrane with repeated slight exacerbations, leading to a hyperplasia of the connective tissue, and subsequent atrophy of the other tunics—the cartilaginous, and even the osseous, forms of metamorphosis, are also sometimes met with.

According to Rokitansky,[1] these changes are only met with in cases where the inflammation has been so severe as to completely destroy the mucous membrane, which is then replaced by a serous lining instead. "Fibroid tissue occurs also as fibroid and cartilaginiform thickening of the walls of mucous cavities, which have been converted in the way already described into serous cavities; the fibroid tissue may then, as in the case of membranes originally serous, be deposited as an exudation, upon the surface of the new membrane, or as a subserous production beneath it." "Under the same conditions, that is to say, only after the mucous membrane has undergone this complete change of texture—

"Anomalous bone is formed upon it, or ossification, as it is called, takes place: and this again may be a sub-serous production, or an ossified exudation on the surface."

[1] Loc. cit., iii., 64.

The latter change appeared to Meckel to be the result of an endeavour to convert a membranous into an osseous cavity, similar to that which prevails in the vertebral and cranial cavities.

This process of osseous degeneration, or calcification, as it is more commonly called, is found to consist in the infiltration of the connective tissue with calcareous particles. Physiologically, in the formation of bone the fibrous or cartilaginous matrix is infiltrated with the calcareous particles formed by the lime and magnesian salts in a precisely similar manner. But in the latter case an active process is going on in the matrix, in which there is not only a deposition of the earthy salts taking place, but a proliferation of the cellular elements, and an intimate union of the calcareous matters with the new tissue, the result of which is a true osseous structure, in which no calcareous particles can be detected on microscopical examination. The pathological process, on the other hand, is a purely passive one; there is merely an infiltration of the structure with calcareous particles, without any cell-proliferation, or alteration of the intimate structure, or increase of nutritive activity in any way:—

"All those conditions, which tend to produce atrophic and retrogressive changes in a part, and at the same time to interfere with the circulation in it, are liable to be followed by its calcification. Inflammation, rapidity of growth, diminished nutritive supply, and general impairment of vitality, may all of them give rise to this process. This is seen in the calcification of atheromatous arteries, of caseous masses in the lungs and lymphatic glands, of many new formations, and of the blood-vessels and cartilages in old people. In its morbid antecedents, calcification thus somewhat resembles fatty degeneration, and its pathological signification is in many cases equally difficult to determine. Fatty degeneration, indeed, very frequently precedes the calcification, which is merely a later stage of the retrograde process." (Green, Pathology and Morbid Anatomy, p. 88.)

Rindfleisch[1] has offered the following explanation of the cause of the deposition of the calcareous particles in the atrophied structures:—

"Those peculiarities in the movement of the nutrient juices, and

[1] Loc. cit., i., 51.

especially a certain retardation, or even stagnation, of their current, which may be assumed as likely in the said localities, owing to the absence of lymphatics, stand in some sort of casual relation to the process of calcification. Should this view be correct, we might conceive the precipitation of the earthy salts to occur in some such way as this: the free carbonic acid, to which their solubility is due, in consequence of its great diffusive power, forsakes the stagnant nutrient fluid, and escapes from the organism by other channels; while the calcareous salts, rendered insoluble by its removal, are forthwith deposited in a solid form."

In the concluding paragraph of his description of the process he says:—

"Calcification, wherever it occurs, is always a true infiltration. The specific form of the infiltrated structures, at least in its coarser outlines, is never effaced. We are able, as a rule, to restore matters to their previous condition by simply removing the earthy salts with hydrochloric acid."

The tissue, which has become calcified, undergoes no further change, its vitality is completely destroyed, and it remains as an inert mass.

Instances of these forms of degeneration are but very rarely met with, but scattered cases may be found here and there, among the old writers particularly. Gyser, in a fatal case of dysphagia, found at one point of the œsophagus that the calibre of the tube was so narrowed as not to admit the passage of a sound. The constriction was produced by a ring of cartilaginous consistence. Similar cases have been recorded by Becker, Bang, Baldinger, Andral.

These older pathologists speak of it as a rather frequent condition resulting from chronic inflammation of the œsophagus, but later writers do not seem to have met any instances of this cartilaginous condition of such large tracts of the œsophageal walls. It is extremely probable that in using the term "cartilaginous," they merely meant to convey the idea of cartilaginous hardness, which is found in old-standing fibrous strictures.

Cartilaginous degeneration of the gullet throughout its whole length is said to have been seen by Sampson, Garnia,

and Desgranges. Sampson[1] found at the autopsy of a woman, who had long suffered from dysphagia, that the œsophagus was cartilaginous in its whole length, from the level of the clavicles to the stomach. The canal barely admitted a hog's bristle. Desgranges[2] found an œsophagus in a similar condition, but not constricted. The cartilaginous material terminated above the cardia in a prominent ring.

Symptoms.—The symptoms present when the walls of the œsophagus have undergone any of these forms of degeneration, will be those of dysphagia, more or less marked, according to the nature and the amount of the change which has taken place. The contractile power of the walls of the tube being of course irrecoverably lost in the affected part, the bolus must depend for its transmission through this portion on the "*vis a tergo*" transmitted through the succeeding portions of food, aided, of course, by that universal law of nature, gravity. Yet in the remarkable case recorded by Garnia,[3] there was never any dysphagia present. The case was that of an English prince, whose gullet after death was found to be "membranous externally, and cartilaginous in its whole extent internally, and even osseous towards the stomach for the length of one inch." This prince had, during the last two years of his life, vomited every day about two hours after each meal, but had never complained of any difficulty in swallowing.

Suppuration.—The permanent tumefaction which is usually the result of chronic inflammation of the mucous membrane, is attended with an exuberant formation of epithelium. This (together with the emigrant leucocytes which are found mingled with the epithelial cells) usually keeps up a copious mucopurulent discharge from the free surface of the membrane.

The following case recorded by Smith,[4] appears to be an

[1] Misc. Curios. Ann., 1613, p. 170.

[2] Jour. de Boyer, et Corvisart., iv., 203.

[3] *Vide* Morgagni, De Sedibus, &c., Epist. xxviii., 15.

[4] Quoted by Mondiere, Arch. Gen. de Med., xxv., from the Medical and Physical Journal, ix., 552.

instance of suppuration and formation of abscess following the chronic form of œsophagitis, with the addition, perhaps, of a sub-acute attack, induced by an ordinary "catarrh":—

"In the month of April, 1803, I was called to visit Elizabeth Brown, who appeared affected with stricture of the œsophagus. She was unable to swallow any solid food, and she also suffered from great dyspnœa, especially when she lay down, and on this account was obliged to sit up in bed supported by pillows. I learned, on questioning the patient, that since about a year before she had suffered slight difficulty in swallowing, and that in the preceding January she had got a very severe attack of catarrh; but it was only about seven weeks ago that the dysphagia became greatly increased, and the dyspnœa so aggravated as to alarm both herself and her friends. She said, to make use of her own expression, that she 'felt in her throat a mass' which prevented her from swallowing, and which threatened her with suffocation. I got her to take some liquid in my presence, but she was able to swallow only a very small quantity, and during the act of deglutition, a peculiar kind of bruit was heard, resembling that which is produced in gargling the throat. I conjectured that there was some narrowing of the œsophageal tube, and possibly some tumour which compressed the trachea, and occasioned in this way the dyspnœa, and this opinion was confirmed on finding that there was some swelling of the neck below the cricoid cartilage. . . . The treatment which was adopted at the time gave some relief, but on the following day the symptoms returned with increased severity. I proposed to introduce a bougie into the œsophagus, for the purpose of trying to dilate the canal, but the patient would not comply. Her condition grew rapidly worse, the dyspnœa increased in severity, and the patient died at last, as if suffocated."

"Autopsy.—I remarked that the neck which, during the last days of life had been considerably swollen, was very much reduced in size at the time I came to examine the body. On dividing the trachea a considerable quantity of pus escaped; it had penetrated into that tube at its posterior and superior part, where an opening was found a quarter of an inch long, and communicating with the œsophagus. The walls of the latter tube were greatly thickened in this situation. The opening which communicated with the trachea was barely large enough to admit a crow-quill. On opening the œsophagus it was found to contain a great quantity of matter . . . . resembling curdled milk: the inferior part of the tube was healthy, as were all the other organs. The pus had passed into the trachea through the above-mentioned opening, and this was probably the cause of death."

Perforation as a result of simple catarrhal inflammation of

the mucous membrane, whether acute or chronic, is very rare, if indeed it ever occur; and it is impossible to determine from the record of this case, whether the inflammation had been originally of the ordinary catarrhal form, or whether, indeed, it had commenced in the mucous follicles, the latter of which, if we may judge from the termination of the case, would be the more likely. It is also open to question, whether the communication which was found to exist in this case between the trachea and œsophagus was due to the formation of an abscess in the wall of the latter which made its way into both canals, or, whether perforation of the œsophagus first took place which would lead to the formation of an abscess in the areolar tissue between it and the trachea, owing to the irritation of portions of the ingesta passing through the ulcerated opening. In the latter case, the subsequent opening into the trachea might be due either to the extension of the ulcerative process through the walls of the latter, or to the pointing of the abscess. If due to the latter process, the two openings must lie on a different plane, as the abscess will always be found to extend downwards in such cases.—(Mondiere.)

Ulceration.—This is often a result of the chronic form of inflammation, and usually in its turn pursues a very chronic course. It is most likely to occur when acute or sub-acute exacerbations supervene. The membrane becomes intensely hyperæmic, while the submucous tissue is infiltrated with an abundant serous effusion. The rapid cell-proliferation which now takes place in the membrane, whose vitality has been already lowered by the effects of the chronic inflammatory process, leads to a loss of substance in the epithelial covering which then extends into the basement membrane, and may, or may not, be limited by the submucous areolar tissue. In the former case the ulcer usually cicatrises rapidly when the destructive process has ceased. According to Rokitansky a large ulcer does not cicatrise, but acquires a fibro-callous base which remains bare, and sometimes obtains a smooth covering like serous membrane.

The ulcer which follows inflammation of the œsophagus is

usually single, and more than two rarely co-exist. The upper part of the tube is its most frequent seat, and it was long ago laid down by Sir Everard Home that the posterior aspect was usually affected, but this is not in accordance with the experience of some later observers. The greater number of the cases of simple ulceration of the œsophagus which the present writer has found recorded have certainly been met with in this situation.

Another case in which ulceration may occur as a more remote consequence of chronic inflammation is, when the latter has led to narrowing of the calibre of the tube, the result of repeated exudations of large quantities of lymph, which afterwards contracts. In this class of cases the ulcer is found on the cardiac side of the stricture.

We have already dwelt at considerable length on the symptoms which are indicative of ulceration of the lining membrane of the œsophagus. Sir E. Home thought that the only way in which ulceration could be diagnosed from stricture of the canal was by the use of the bougie. He believed that a well-educated touch could distinguish the irregular surface of an ulcer, and he lays down as an absolute rule that when "the bougie passes without any difficulty to the distance of seven and a-half inches,[1] and when brought back the point has an irregular jagged surface, it is clear that the disease is an ulcer on the posterior surface of the œsophagus." Dr. Benson[2] has ridiculed Home's method of diagnosis, and we do not think that any practitioner of the present day professes to have the "tactus eruditus" so highly developed as to be able to *feel* an œsophageal ulcer. An excellent analysis of the characteristic symptoms of ulcer occurring in this canal will be found in the observations made by Dr. Gordon on the case of ulcer and perforation of the œsophagus, which he exhibited to the Dublin Pathological Society on December 16, 1855.

With regard to the terminations of this variety of ulcer, it usually heals in one of the ways we have mentioned. It

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[1] *I.e.*, from the upper incisors.

[2] *Vide* Lecture, *Dub. Med. Press*, 1841.

rarely leads to perforation of the walls of the tube, although instances of this result have been occasionally observed in cases where the ulcer complicated a previous narrowing of the tube. An unusual termination is in death by hæmorrhage from erosion of the small vessels, of which a case is related in Copland's Dictionary. In this case the patient, an aged female, had suffered for years from digestive disorder, accompanied by psoriaris. For some time before death œsophagitis had been present. The hæmorrhage was sudden and profuse, and quickly ended fatally. After death a large ulcer was found on the left side of the œsophagus in its upper third, which had eaten deeply into the muscular coat, but no large vessel was found opened.

Varicose Ulcer.—It will be convenient to notice in this place the very rare condition of "varicose ulcer" of the œsophagus. An example was exhibited to the London Pathological Society by Dr. Bristowe (December 16, 1856) :—

"The patient, a woman of forty-eight, had been suffering from dyspepsia. A sudden attack of hæmatemesis was followed by death on the following day. On examination, the veins of the mucous membrane were found to be enlarged and tortuous, especially in the lower part, having all the characters of varicose veins of the lower extremities. . . . . About two inches above the cardia was a recent opening, about the size of a No. 4 catheter, from which a small fibrinous plug protruded. It had laid open one of the varicose veins from which the fatal hæmorrhage had proceeded."

Croupous Inflammation.—The mucous membrane of the œsophagus is occasionally the seat of croupous or "exudative" inflammation, which is characterized, here as well as in other situations, by the production of a fibrinous layer on the surface, usually known as the "false membrane." We shall not attempt to separate the croupous from the diphtheritic form of inflammation, inasmuch as many of the best pathologists now acknowledge that it is difficult, if not impossible (some indeed say that it is entirely impossible) to draw any line of demarcation between the histological changes occurring in diph-

theria, and those of croup. With the specific fevers, of which this form of inflammation is usually seen as a local manifestation, we have at present no concern; we shall merely consider the local changes which take place in the mucous membrane of the œsophagus.

The inflammatory process in the beginning does not seem to differ from a severe catarrhal one, and consists in hyperæmia of the mucous membrane, with exudation of leucocytes and liquor sanguinis, and rapid proliferation of epithelium. The next step is the formation of the false membrane, which in some cases is tough and firm, in others much softer. According to Rokitansky, "it varies in consistence from that of cream to the toughness of leather, and is greyish white, and yellowish or fibrinous: it sometimes covers the membrane at a few insulated spots, and sometimes forms a more extensive film over it like hoar frost; occasionally it invests the membrane like a layer of gauze; while in some cases it constitutes a membranous, and very often a tubular lining for the mucous surface." "This . . . forms in severe cases a membranous coagulum, the thickness of which may vary, but not unfrequently equals, or even exceeds, a line; towards its margins it is thinner and less tough, and it is at length lost in a layer of muco-purulent substance. Respecting the real nature of this false membrane pathologists are not agreed. Rindfleisch, who is particularly minute on this subject, has found, by a peculiar process of examination, that "the naked-eye appearance of coagulated fibrin is produced by cells, and nothing but cells, which have undergone a peculiar degeneration of their protoplasm, and an equally peculiar fusion with one another." Wagner and others have described a peculiar metamorphosis of the epithelial cells to which they believe that the formation of the false membrane is mainly due. The protoplasm disappears at certain points, apparently receding to certain branching lines, where it assumes a homogeneous aspect, and refracts light more highly than ordinary protoplasm. The nucleus disappears; and the entire cell is then represented by a network of great delicacy, resembling the antlers of a stag in shape. At first the false membrane

adheres to the mucous surface, but "at a later period, a viscid muco-purulent fluid is effused beneath it, so that it becomes loose and is at length set free."

The mucous membrane beneath the "false membrane" presents appearances which vary with the intensity of the inflammation. It is more or less hyperæmic, and swollen, and, on removal of the exudation, looks red and excoriated; the papillæ are red and prominent, and "the surface is covered with numerous red, soft, bleeding spots like granulations, which correspond to the vascular points on the adherent surface of the exudation. The submucous tissues, especially the cellular tissue, appear infiltrated. Neither during nor after the croupy process does the mucous membrane suffer any material injury to its texture: the speedy production of mucus and epithelium prevents any further organization of the plastic exudation beyond the rudimentary condition just described, and it never enters into an organic connection with the mucous membrane."—(Rokitansky.)

In the very severe cases of this form of inflammation (distinguished by many as the "diphtheritic") the inflammatory products infiltrate the mucous membrane and submucous tissues to such an extent that nutrition is interfered with, and patches of the mucous membrane, of greater or less extent, die, and separate in the form of sloughs.

The croupous variety of œsophageal inflammation is met with as a local phenomenon in various constitutional affections. Besides the usual ones, "croup" and "diphtheria," it is sometimes, though very rarely, seen as a complication of croupous pneumonia, and eminently in Asiatic cholera, in which it excels all other examples in quantity of product, rapidity of course, and extent of surface engaged. A specimen was exhibited by Dr. Ogle to the London Pathological Society of a complete membranous cast of the œsophagus brought up by a choleraic patient.

Aphthæ, or thrush (*muguet* of the French writers), is, according to Rokitansky, a special form of this croupous inflammation, in which the exudations are, at least at first,

confined to rounded or oval spots. The process of softening which ensues occasions a loss of substance in the mucous membrane, giving rise to the formation of an aphthous ulcer.

According to the same writer this form of inflammation is also seen as a "secondary affection in abortive exanthematous and typhoid processes, and as a product of a purulent condition of the blood brought on by the tubercular and cancerous cachexia." Henning[1] recorded a case of a maid-servant who became ill at a time when four children in the house were suffering from scarlatina; there was no eruption on the skin, but she suffered from a group of symptoms which indicated that the œsophagus was the part chiefly affected. It was only on the seventh day that the power of swallowing was restored. On the eighth the patient felt a tickling sensation in the gullet, which caused a violent cough that lasted almost continuously till the tenth day, when the patient brought up with the cough a great quantity of membranous débris, "pareils a ceux que l'on remarque lorsque, dans cette maladie, la dequamation de la peau a lieu."

A gentleman consulted Dr. Abercrombie[2] who had caught cold in crossing the Frith of Forth. He suffered from hoarseness, sore throat, and a glandular swelling on the right side of the neck. "The fauces were of a bright red colour, without much swelling, but were covered in places with aphthous crusts." A typhoid form of fever was soon developed, with dysphagia and some dyspnœa. . . . . After death "a loose, soft, adventitious membrane" was found over the inner surface of the pharynx and œsophagus.

Pustular Inflammation.—In variola pustules sometimes form on the mucous membrane of the œsophagus. They have been said to occur also in the lower third of the tube from the too free administration of tartar emetic. According to Rokitansky pustules in this situation are sometimes metastatic to herpes. Indeed the disappearance of cutaneous

[1] Quoted by Mondiere, Arch. Gen. de Med., iii., 38, ii.e série.

[2] "Diseases of the Stomach."

eruptions is a frequent forerunner of inflammation of the œsophagus, of which examples may be found in other parts of this essay. This is the most suitable place to notice the following affection (which we have not found mentioned by any other writer.)

Angina Impetiginosa.—A peculiar form of dysphagia has been described under this title by Chelius,[1] which he has always found associated in some way with a previous, though perhaps unimportant, cutaneous disease. This affection is developed without any apparent exciting cause, or it may follow a slight catarrhal inflammation of the throat. The difficulty of swallowing increases to such a degree, that at last the act becomes perfectly impossible, the smallest portions of food being instantly rejected with spasmodic contraction of the throat, and a feeling of suffocation; and the peculiarity is that fluids pass with much greater difficulty than solids. The mucous membrane of the pharynx is found to present a reticular appearance, with pale streaks and some few insular prominences of a yellowish-red colour. Some parts show a somewhat papular or phlyctenular formation. The patient also complains of a pungent feeling in some part of the throat, as if there was a formation of little pustules or vesicles, leaving an after sensation of a circular spot of tenderness.

Follicular Inflammation.—"Both acute and chronic catarrhal inflammations, and the various processes in which they terminate, may affect the follicles of a mucous membrane, principally or alone. The walls of the follicle then redden, and the parts adjoining, as well as the follicle itself, become injected, tumid, and enlarged: its secretion diminishes in quantity or is suppressed; but sometimes it is more abundant than natural, and either pours freely forth, or being retained in the cavity of the follicle, becomes inspissated, and undergoes various other secondary changes. The result of this process sometimes is a permanent enlargement (hypertrophy) of the follicle, a dilatation of its cavity, or an habitual

[1] *Vide* Costello's Cyclopædia of Pract. Surgery, Art., Œsophagus.

profuse secretion of a tenacious glassy mucus—*follicular blenorrhœa.* Sometimes the process terminates in suppuration of the follicle or *follicular ulcer.* It becomes converted into an *abscess*, which usually bursts through, and discharges itself upon the internal free surface of the mucous membrane: a small, round, crater-like ulcer is then found situated at the top of a rounded conical tumour, and having a hard base: as the suppuration of the follicle proceeds, the ulcer becomes larger and shallower, and when the follicle is quite destroyed, is encircled by a border of loose mucous membrane: it then extends superficially, or, which is rarer, deeply amongst the submucous tissues." The above is Rokitansky's[1] description of inflammation, &c., of mucous follicles, which we thought better to copy in full, as it is the most satisfactory account of these processes which we have met with.

The following interesting example of ulceration of the œsophagus—commencing probably by follicular inflammation, and ending by establishing a fistulous communication between that tube and the left lung, which set up a fatal pleuritis—was brought before the Pathological Society of Dublin, on the 16th of December, 1855, by Dr. Gordon, of the Whitworth Hospital:—

"Teresa M'Quade, *æt.* forty, had been an inmate of the Richmond Lunatic Asylum for the last four years, suffering from melancholy, accompanied by occasional, but short, periods of excitement. She was very delicate, and much emaciated, never ate much food, and several times during her residence in the asylum, almost completely refused it. Within the last year she had two attacks of purpura hæmorrhagica, the extremities being thickly spotted with petechiae, and the hams and back of the thighs and legs covered with large livid blotches. These general symptoms having existed for a considerable time, were succeeded about five months ago by symptoms of local distress, the cutaneous affection having now entirely disappeared, as is frequently the case. The nurse states, that about this time she seemed to suffer from repeated and sudden attacks of dyspnoea, and some time after began to complain of dysphagia. She frequently said that meat and other solid food stopped opposite the upper part of the sternum. Soft solids, or fluids easily swallowed at this time, became afterwards,

[1] Path. Anat., iii., 54.

however, impeded, and she began to vomit repeatedly, but not constantly, immediately after eating. She had occasional vomiting at other times also, which was exceedingly distressing, and she then, with great difficulty, brought up a quantity of viscid, glairy matter tinged with blood. She was commencing to refuse all kinds of food, when she was suddenly attacked with the general symptoms of pulmonary inflammation, and violent cough, which was always induced by attempting to take food or drink, and after a few days' illness, expired on the 13th November."

On exhibiting the parts, Dr. Gordon remarked that the specimen of ulceration of the œsophagus, which he now brought before the Society, presented some unusual characters :—

"The ulceration was of the chronic form ; it commenced at a point corresponding to the bifurcation of the trachea, and extended for about an inch and a-half downwards. There was, first, superficial ulceration of the mucous membrane ; there was one long oval ulcer, half-an-inch in extent, and the mucous membrane at one border of this ulcer was raised up and projecting ; there were also several fistulous orifices, and these were each divided by a thin delicate thread of membrane, such as is frequently observed in cases of thinning of the cardiac valves. These fistulae extended to different depths ; one immediately beneath the projecting fold of mucous membrane, passed downwards and to the left side, and communicated with an abscess which occupied the central and inferior portions of the left lung. This ulcerative process in the lung appeared to be rapidly extending ; the pulmonary structure was falling in, in shreds and detached morsels, without any surrounding induration, or any of the usual anatomical characters of pneumonic abscess, and the contents of the abscess were of a very dark colour, and horribly fœtid. This abscess appeared to be rapidly extending in different directions through the lung, and had already reached the inferior surface by two different routes ; and having in each place perforated the pleura, had given rise to pneumothorax and intense inflammation of the whole surface of the lung. There was seen purulent matter in large quantity lying in the cavity of the pleura, and the lung (particularly the anterior and diaphragmatic surfaces) was coated with soft greenish-yellow lymph.

"Notwithstanding this projecting fold of mucous membrane, and the several fistulous orifices which exist in the œsophagus, the affected portion of the tube is found to be rather dilated than contracted, and the disease is confined to a portion of the tube, one inch and a-half in extent, there being no narrowing or other disease, either above or

below this point; but the symptoms which attended this case during life were such as usually indicate great narrowing of the œsophageal tube."

In his remarks on this case, Dr. Gordon made the following valuable observations on the symptoms and differential diagnosis of ulceration of the œsophagus:—

"The identity of symptoms in different diseases of the œsophagus, render their diagnosis often very difficult; thus we find, that the extraordinary case related by Mayo, of great dilatation of the œsophagus, unaccompanied by any stricture or narrowing, was attended with all the symptoms which are usually found in cases of the closest organic strictures of the œsophageal tube. We are the less surprised, therefore, when we read of cases of ulceration of the œsophagus being confounded with stricture—the present case, however, seems to support the idea, that while in stricture of the alimentary canal there is generally reference to a local distress, or inconvenience before the general phenomena of emaciation and vital depression become developed; in ulcerative œsophagitis, on the other hand, the succession of symptoms is reversed, and the constitutional take precedence of the local by a long period of time—this is particularly so, when, as appears to be the case in the present instance, the ulceration commences in the mucous follicles: these constitutional symptoms are, of course, very diversified in character; they are sometimes, though rarely, of a specific nature, typhoid, tubercular, or even syphilitic. But we learn also from this case, that the local symptoms in the two diseases differ, for while in confirmed organic stricture the dysphagia is progressive—first pain, then difficulty, and at last an impossibility of swallowing solid food, and the patient soon learns from experience the inutility of attempting to swallow certain kinds of food, or morsels of a certain size, for what has been once fairly tried without success he will seldom again venture on; in ulceration of the œsophagus, on the contrary, the food which is rejected to-day may pass down without much trouble tomorrow; and it is surprising, in such cases, to observe the apparent caprice of the œsophagus in the nature of the food which it permits to pass; thus I have seen a person who could not swallow chicken-broth or arrowroot, eat, with comparative comfort, though certainly with a great deal of pain, dressed lobster and other such irritating food; and what the ulcerated œsophagus rejects to-day, it may tomorrow readily admit, and-*vice versâ*.

"This constant variation in the degree of the dysphagia is, of course, different from a restoration of the power of swallowing, which sometimes takes place in strictures of the œsophagus after it has been long

lost. This is owing to an extensive process of ulceration, and is usually indicative of a rapid termination of the disease.

"There appear to be four distinct phenomena always attendant on ulceration, which are not so constant in stricture of the œsophagus. These are, first, *local pain;* this is seldom or never absent, if the ulceration be extensive; it varies much in character, sometimes it is excessive; it has been described by patients as if a hot iron were constantly in contact with the part: now in stricture it frequently occurs that there is no pain complained of, unless when the patient attempts to eat or drink, so that those patients often say that if they could refrain from eating they would be free from pain. But in ulceration of the œsophagus, while eating increases his distress, the patient, unless when asleep, is never free from pain. The other symptoms are a *constant sensation of weight or oppression on the chest*; these sometimes amount to great dyspnœa, or even a form of angina pectoris; there is also a *constant hawking up of a ropy viscid mucus*, which is frequently tinged with blood, and this being exceedingly tenacious, causes usually a great amount of distress; there is also generally *profuse ptyalism;* this is said by many to occur only when the upper part of the œsophagus is diseased, but it existed in this case where the ulceration is not found in the superior part.

"The exact mode in which this case terminated is rather unusual; a fistulous tract passed from one of the ulcerated mucous follicles downwards and towards the left lung, where an unhealthy inflammation caused the rapid formation of an abscess. This occurrence, of course, gives rise to an entirely new set of symptoms indicating pulmonary irritation; the most marked of these usually are; the immediate production of violent fits of coughing by any attempt to swallow food, and this cough is attended with copious expectoration, in which morsels of the food or drink swallowed are thrown up with the ordinary pulmonary expectoration."

This form of ulceration is usually found where the vital energies are greatly depressed, and generally follows low fevers, or the retrocession of skin eruptions. Its most frequent seat is towards the lower part of the œsophagus, in which point it differs from the ordinary ulceration of the mucous membrane, which, as we have seen, is oftener found in the upper part of the tube.

CHAPTER V.

PERFORATION OF THE ŒSOPHAGUS.

Cases of perforation of the walls of the œsophagus may be divided into two great classes :—

I. Those in which the solution of continuity is due to some morbid action commencing in the parietes of the tube.

II. Those in which it is due to some cause external to the parietes. Of this class there are two subdivisions :

(*a*) Where the destructive process is set a-going by some cause situated within the canal; in which case the perforation is from within outwards ;

(*b*) Where the exciting cause is situated external to the canal, and the perforation is from without inwards.

The first class of cases includes those in which the perforation is due to an ulcerative process whether simple or specific in its nature, also those due to gangrene, abscess, &c.

The ordinary form of ulcer of the œsophagus which follows chronic catarrh of the lining membrane does not usually show any disposition to perforate, as we have already seen. But there is a variety of simple ulcer of the œsophagus, commencing probably in the mucous follicles—but the pathology of which is up to the present involved in great obscurity—which runs a rather chronic course, and which always shows

so decided a tendency to make its way through all the coats of the œsophagus that it fully merits the name of *Perforating Ulcer*.

The pathology of this form of ulcer, as it is met with in the œsophagus, is, as we have already remarked, very obscure, and we are not aware that any satisfactory account has been given of its course. The perforating ulcer of mucous membranes, as a rule, has its origin in the lymphatic follicles, the most frequently occurring example being that met with in enteric fever. But in the gullet and stomach perforation occurs in situations where not a single lymphatic follicle can be discovered. The ulceration in the latter organs runs a much more chronic course than that of the former class. The theory of embolism, and consequent digestion, which is supposed to account for the phenomenon of gastric ulcer, is also inadmissible in the variety of ulcer with which we have to deal at present. The ulceration, so far as we know, seems to commence in the mucous follicles. That the morbid process sometimes began in these structures was first noticed, we believe, by Brunner.[1] This perforating ulcer has not been noticed by Carswell, nor even by Cruveilhier or Rokitansky. Albers described a "simple ulcer of the œsophagus," which, he says, follows a course exactly similar to that of the simple ulcer of the stomach, perforates the coats of the tube and opens into the trachea, pleura, aorta, &c.

Another interesting specimen of "perforating idiopathic ulcer" was exhibited to this Society by Dr. H. Benson, February 1, 1872:—

The patient, a woman, æt. fifty, had all the appearance of a woman of seventy-five or eighty. She was extremely emaciated, and had much of that peculiar appearance which would lead one to say that she was the victim of cancer. The glands in the groin, neck, and axilla were considerably hypertrophied, and those in the mesentery could be also perceived, so great was the emaciation, to be enlarged. She complained of a slight soreness behind the centre of the sternum, but by far the most prominent symptom was the extreme dysphagia. She was unable to swallow the smallest particle of food or drink, for regurgitation

[1] De Gland. Duodeni, cap. x., 136.

immediately followed any attempt at deglutition. From these facts he was led to believe that he should eventually find cancerous disease involving the œsophagus and obstructing the passage of food. Nourishment was then administered by the rectum. This continued for about three weeks, when, to his astonishment, she began rapidly to recover the power of swallowing. He then modified somewhat the terms of his diagnosis, and thought that there was a tumour which pressed on the œsophagus causing obstruction, and which, for some reason unknown, had then altered its position and allowed the free passage of food.

She improved for a little after this, but the improvement did not continue. An uncontrollable diarrhœa set in which emaciated her more than ever, and she gradually sank.

On examining the body after death an oval opening was found in the œsophagus about five inches from its extremity. This opening was the result of an ulcer which, commencing on the mucous surface of the œsophagus, had perforated all the coats of that organ, and even the layer of pleura covering it, and had commenced to attack the opposite pulmonary pleura. This was shown by the presence of a circumscribed patch of vascularity on the membrane corresponding in size and shape to the position of the ulcer. A thin layer of lymph corresponding to the base of the ulcer, and causing a temporary adhesion, must have prevented extravasation during deglutition, but it was torn through when the lung was raised out of its position. On slitting up the œsophagus a patch of ragged ulceration of the mucous membrane was found about the size of the palm of the hand distributed around the central perforated portion ; this latter was about the size of a shilling, and had a rounded thickened margin.

Dr. B. thought that in the state of the parts he had a reasonable explanation of the apparently anomalous symptoms of very extreme dysphagia, followed by comparative ease in deglutition : for while the disease was more recent and the inflammation acute, the reflex spasm of the œsophagus invariably took place on the introduction of food which ceased to occur when the deep destruction of the tissues was the result and the inflammation became less active.

The sudden change from extreme dysphagia to comparatively easy deglutition which occurred in this case, and which continued up to the time of death, exactly resembles that which takes place when there has been extensive ulceration of a previously existing stricture (as observed by Dr. Gordon), and differs remarkably from what is usually seen in similar cases of mere ulceration.

A striking example of the insidious course which this

perforating ulcer follows in some cases is afforded by the following[1] :—

A man, about thirty years of age, was brought into Mercer's Hospital in a state of asphyxia, into which he had suddenly fallen in the act of eating. A probang was passed into the stomach, and other remedial means employed, but without effect—life was extinct in a few minutes.

On examination of the body, an opening was discovered between the œsophagus and the lower part of the trachea, through which a piece of gristly meat had partially escaped. The piece of meat was divided into three lobes, one remaining in the opening while the other two were engaged in the right and left bronchi ; the latter of which was completely, and the former partially, obstructed. The perforation was about the size of a fourpenny piece, with edges rounded and covered with mucous membrane. According to the statements of the man's friends he had enjoyed good health up to about four or five months ago, when after a debauch, in the course of which he remained all night in a public-house, he became subject, during his meals, to fits of coughing, and on several occasions was on the point of suffocation.

In this case, except during meals, the ulcer does not seem to have given rise to any prominent symptoms up to the last. Pain was not complained of so far as could be learned, and there were never any constitutional symptoms of sufficient gravity to prevent the man following his ordinary avocations.

A case of perforation more typical in its course and symptoms than the last was brought under the notice of the Royal Medical and Chirurgical Society of London, by Mr. Salter, of Poole[2] :—

It occurred in the person of a clerk, *æt.* 42, of very intemperate habits. He had suffered for some time from dyspepsia and constipation. Subsequently he expectorated a quantity of clear mucus, streaked with blood. Then, after an attack of what appeared to be mild bronchitis, he became very much reduced in strength, difficulty in swallowing came on, and after the food had passed into the pharynx it was soon rejected covered with mucus from the trachea. . . . . He gradually sank from exhaustion, and on examining the body there was found, answering to the diagnosis, an ulcer without any induration opening into the left bronchus.

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[1] *Dub. Med. Press*, iv., 116.

[2] *Lancet*, 1853, vol. i.

Andral believed that the perforation in every case was found near the cardiac orifice, but this, as may be seen from the perusal of the above cases, was an error. Albers thought that it was at the bifurcation of the trachea. Perforation sometimes takes place in cases of organic stricture of the œsophagus at a late period of the disease. In these cases an ulcerative process is set up below the seat of stricture, which, in cases of very long standing, occasionally destroys the whole thickness of the wall of the tube. Sir E. Home attributed this form of ulceration, and, we think, with a plausible show of reason, to the almost continuous irritation which is kept up by the repeated retching which is present in these cases. The wave of contraction proceeding from below upwards and abruptly stopped by the unyielding stricture, must tell with special effect upon that portion of the walls of the tube immediately below the seat of constriction; while the regurgitated matters, being denied a free exit through the narrowed orifice, must be driven with full force against the lining membrane on the under surface of the projecting valvular tissue, and on the inner surface of that portion of the tube immediately below. This repeated irritation doubtless sets up a slow process of inflammation, ending in ulceration, and this takes place all the more easily from the lower vitality of the cicatrical tissue which enters into the formation of the stricture, and which probably infiltrates the submucous tissue for some distance above and below. The ulcer so formed sometimes ends in perforation: but more of this when we come to deal with the subject of strictures.

Vigla[1] collected from various sources eighteen cases of perforation of the œsophagus communicating with the bronchi or lungs, which, with the affection leading to this result, are tabulated as follows:—

	FOIS.		FOIS.
(Communication with) Le poumon droit.....	10	(Disease) Ulcère simple.....	5
La plêure droite.....	2	Sqirrhe.....	6
La bronche droite...	2	Gangrène.....	2
Le poumon gauche..	3	Fibro-cartilage....	1
Les deux poumons...	1	Alteration vague.	4

[1] Arch. Gen. de Med., 1846.

Flower has recorded a case of genuine simple ulcer of the œsophagus ending in perforation of the aorta, which he believes to have differed in its essential particulars from all the cases of a similar kind which had been previously recorded. The patient, a painter, æt. 51, was admitted into hospital suffering from deep-seated pain at the top of the sternum and shooting back to the spine. He had been complaining of this pain for only about a week, at the end of which time he had an attack of profuse hæmorrhage from the mouth, which continued till syncope came on. It was after this that he was brought into hospital. On the morning after his admission he had another attack of hæmorrhage, in which "a pint of arterial blood gushed from the mouth." He died in a few minutes after. On *post-mortem* examination—

Four irregularly-shaped patches of erosion were found round the cardiac orifice of the stomach, involving partly the stomach and partly the œsophagus. Their longitudinal diameter was in the direction of the tube, and they were each from two to three lines in length.

"In the mucous membrane of the œsophagus, three inches above the cardiac orifice on the left side was a perfectly circular opening three and a-half lines in diameter, with slightly elevated edges, which were sharp and clean, as if cut out with a punch, and levelled off from within outwards, the mucous membrane being destroyed to a greater degree than the tissues beneath; in fact, exactly resembling, on a small scale, the circular perforating ulcer so frequently met with in the stomach. This was immediately surrounded by a reddish halo, but the mucous membrane elsewhere appeared healthy. On the inner surface of the aorta, at the termination of the descending portion of the arch on the right side nearly corresponding to the ulcer of the œsophagus, but on a rather higher level, was an irregular opening about one and a-half lines in width, with ragged edges formed by the projecting and torn lining membrane. . . The opening in the aorta and that in the œsophagus communicated freely. . . The distance between the inner surface of each tube was seven lines. The passage between them contained a clot of blood, and was surrounded with loose cellular tissues infiltrated with blood, but presenting no signs of inflammation, nor any attempt at adhesion between the vessel and the œsophagus."

In the latter point the writer believes that this case differs from all those previously recorded.

Those cases in which the perforation is due to abscess or gangrene of the walls of the tube have been considered under these headings.

With regard to the second class of cases in which the perforation is due to an "external" cause, those of the first subdivision include only the perforations caused by foreign bodies, and will receive due attention in the chapter on that part of our subject.

Of perforations from without, an example is given by Andral[1] of ulceration of the trachea opening into the œsophagus. Abscesses or malignant growths commencing externally may also penetrate into the canal. Aneurisms of the aorta have not unfrequently ended by opening into the œsophagus. An extraordinary case has been recorded in which this communication was established nearly eight weeks before the patient's death. (Med. Chirurg. Trans., xvi., 339.)

Symptoms.—The symptoms to which perforation of the œsophagus gives rise depend on the nature of the communication which is established by the abnormal opening in its wall, between the interior of the tube and the surrounding parts. If the opening be merely into the surrounding cellular tissue, the symptoms will be those dependent on extravasation of ingesta with rapidly diffused inflammation. The patient in such cases usually dies exhausted by the hectic caused by the profuse suppuration; or, the abscess which forms may compress the œsophagus, and prevent deglutition, or, compress the larynx or trachea so as to prevent respiration with a still more rapidly fatal result.

If the opening communicate with one of the great blood-vessels in the neighbourhood, rapidly fatal hæmorrharge will, of course, be the result.

If a communication be established between the œsophagus and the air-passages, a special train of symptoms will be observed which are worthy of consideration. The following are the chief points on which reliance should be placed for the

[1] Clinique Medicale, t. ii.

diagnosis of this condition, according to Vigla, who has paid special attention to the subject.

(1) The pain is no longer limited to the course of the œsophagus, but extends all over the corresponding side of the chest, being deeply seated, and reaching to the shoulder of that side. In one of the cases to which he refers, the patient felt a crackling sensation in the right side of the thorax, while carrying a heavy load on his shoulder, and it was at this moment that the abnormal communication took place.

(2) The introduction of aliments, and especially liquids, into the gullet, produces pain, dyspnoea, cough, and expectoration of variable nature. Sometimes bland fluids, such as milk, produce less irritation than stimulating ones, such as wine, &c. The pain which is produced under these circumstances is usually very intense.

(3) Cough is always present and occurs in violent paroxysms, and when the patient is troubled with it at other times than after deglutition, it is always worse after this act. The patient then seems to be threatened with suffocation, and the difficulty of respiration continues for a long time after the cough has ceased. Fluids are rejected either by simple regurgitation, or with violence "sous forme d'écume," or mingled with a large quantity of bronchial secretion. The sound, when introduced into the œsophagus, passes easily into the respiratory passage, and the result of this is, acute pain (so severe as to lead to syncope in one case), while at each expiration a quantity of air escapes by the sound. These symptoms are still more severe when fluids are introduced by the sound.

(4) Independently of the return of fluids, the cough is attended by expectoration of a variable nature. In one case it at first consisted of a viscid mucus, and was small in quantity, later on it became "un liquide véritablement purulent rejeté avec détritus d'organes."

CHAPTER VI.

RUPTURE OF THE ŒSOPHAGUS.

Spontaneous rupture of the œsophagus is—as we should naturally expect from the yielding structure of its walls, and the slight strain which is thrown upon them by the fulfilment of the ordinary functions of the organ—an exceedingly rare event. Some writers on the subject, indeed, have been so sceptical as almost to try to explain it away altogether :[1] the following classic case, however, recorded by Boerhaave, seems to have passed unquestioned by almost all :—

The Baron de Wassanaer, grand admiral of Holland, who was of an excitable temperament and subject to periodic attacks of gout, had a habit of bringing on vomiting with ipecacuanha and infusion of carduus benedictus to relieve himself of a feeling of oppression and weight, which he experienced at the upper orifice of the stomach, every time that he had indulged in any excess at table, which happened pretty often. This method succeeded so well that all representations could not make him abandon it. On one occasion, some hours after a copious dinner, as the ordinary dose of his emetic did not act with the rapidity which he had expected or wished, he excited vomiting by drinking a great quantity of his infusion, and making extraordinary efforts. Suddenly he felt an excruciating pain, and declared that he had broken or injured something about the upper orifice of his stomach, that the situation of the viscera of the chest was changed, and that speedy death was about to end his days. This man, who had always borne with the most heroic patience the acute attacks of gout to which he was subject, now cried and rolled himself on the ground. Cold sweat, a small and thready pulse, with paleness of the face and of the extremities, also announced the excess of his sufferings. When carried to

[1] Mondiere, and after him Velpeau, considered all such cases, as examples of "Ramollissement Gelatiniforme." *Vide* Dict. de Med., Art. Œsophage.

bed he could there rest only in the upright position, supported by three men, and with his body bent forward. Every other position, and even the least movement, augmented his sufferings. In this state he drank about twelve ounces of equal parts of olive oil and of medicated beer, which aggravated his pain. Boerhaave, when called in, did not know the nature of the accident. Eighteen hours after, he died in the most inexpressible agonies. Boerhaave himself made the sectio cadaveris. He found the peritoneum, stomach, and intestines distended with a great quantity of air. The stomach contained but a very small quantity of the liquid which he had drank. The cavity of the thorax contained a great quantity of air, which escaped with a rush when a small opening was made in the pleura. The lungs were compressed and discoloured, and swimming in a liquid similar to that which was found in the stomach. There were 104 ounces of this fluid removed from the thoracic cavity. On the left side there was seen, at a distance of three inches from the diaphragm, a sort of tumour with a diameter of about three inches, which was formed of cellular tissue, lax, and as if inflated where there was seen a slit of an inch and a-half in length by about three lines in breadth. In the midst of that swelling was found the œsophagus completely divided transversely, and with its two ends retracted towards their respective attachments. *The closest scrutiny was unable to discover either ulcer or erosion in any part of the organ.*

Even this case, however, which indeed has been quoted by almost every writer on the subject, has been questioned by Mr. Wilkinson King, who, having met with some cases of *post-mortem* digestion of the œsophagus,[1] would refer all these cases of apparent laceration to that cause. He himself has recorded a case[2] of a hard drinker who, whilst indulging at a public supper, became sick and vomited slightly. Severe pain in the epigastrium followed. The face, throat, and chest became emphysematous, and dyspnoea set in, which gradually increased. He sank after fourteen hours of great distress. A large rent was found in the œsophagus where it passes through the diaphragm, and the fundus of the stomach was softened by digestion. Still Mr. King believes that there was not a rupture in this case, and observes—"If there be a rupture, it is impossible to say where the *post-mortem* solution ends,

[1] *Vide* p. 85, *et seq*

[2] Guy's Hosp. Rep., 1843.

and the laceration begins." He thinks that death was the result of a "sudden inflammatory tumefaction of the larynx." Nevertheless, this case had been detailed by Habershon[1] as an instance of rupture taking place during life, and Copland coincides with this view. Habershon thinks it "probable that the œsophagus was much dilated with food, and that its coats were softened either by previous disease, or by digestion from gastric juice regurgitated into it from the stomach, and there remaining sufficiently long to corrode its walls."

Canton, who has met with a very interesting case of "digestive solution of the œsophagus,"[2] would also refer all the recorded cases of "forcible rupture" to this cause.

Another often-quoted case of rupture is that related by Dryden.[3] The case was one of an officer who, in straining to vomit after a fit of inebriation, "felt something give way internally which gave him the sensation as if he had received an injection of some liquid matter into the cavity of the thorax. He also brought up a little blood," and suffered acute pain "about the region of the stomach and abdomen. . . . The vomiting now ceased, and was succeeded by thirst, great heat in the stomach and throat, constipation, and restlessness." Emphysema of the neck then manifested itself. Death took place about eight or ten hours after the first attempt at vomiting. Mr. Dryden thinks that the "action of vomiting was the sole cause of rupture." This case, and that of Boerhaave, are the only two which Meyer could find recorded with sufficient minuteness to be identified as genuine cases of rupture. He himself has added another of which we subjoin a brief account.[4]

The patient, a shoemaker, of robust frame but intemperate habits, had swallowed some soap-ley when a child, and had ever since suffered, from time to time, some difficulty in swallowing solid bodies. This had increased of late years with his intemperance. One day a piece of sausage became arrested at the usual spot, and he made

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[1] Diseases of the Abdomen, 2nd ed., p. 81.

[2] *Vide* p. 87.

[3] Med. Comment., Edinburgh, 1788.

[4] Berlin Med. Zeitung, 1858.

violent efforts to bring it up again. The morsel did not return, but some bright-red blood was discharged. A feeling of great anxiety, with intense epigastric pain, was now experienced. An hour after the right side of the face began to swell. The symptoms increased in severity. In bed he was obliged to maintain the erect position, and derived most ease from bending the body forwards. Death took place fifty hours after the commencement of the symptoms. Professor Virchow, who examined the body, found about three inches above the cardia a gaping, ulcerated surface, about an inch and a quarter long, and three-eighths of an inch broad, in the anterior wall of the œsophagus. The coats all around were quite healthy. There was some narrowing of the tube just above the cardia; the rest was somewhat dilated.

Dr. Charles[1] has published a case of rupture of the œsophagus occurring in a man who had been drinking for some days. He had felt unwell after a light dinner, and whilst attempting to vomit, had felt something give way in his inside. Severe pain followed, accompanied by dyspnoea, and intense thirst, and death took place seven and a-half hours after the fit of vomiting. On examination:

The mucous membrane of the lower third of the œsophagus (A Plate VI.) is slightly softened, and of a reddish colour close to the cardiac orifice. On the left side, near the posterior wall, there is a longitudinal fissure (*a*) through all the coats. . . . from immediately below the cardiac orifice of the stomach upwards for an inch and a-half, but further in the mucous membrane than in the muscular and fibrous coats. No doubt it has been somewhat enlarged by manipulation. It leads into a space or kind of sac (BB) in the posterior mediastinum, which almost surrounded the lower third of the œsophagus, and extends from the cardiac orifice of the stomach to the root of the lungs, the left one especially. This space contains grumous matter like that in the stomach. . . . On careful examination it proves to be the ordinary areolar sheath of the œsophagus, distended and altered in character by the fluid lying in it. . . . The mucous membrane of the upper two-thirds of the œsophagus is of an opaque whiteness, and presents no abrasion of any kind.

The writer also quotes the following observations of Bambeger:—"Rupture of the œsophagus is in general a very rare phenomenon. In a few cases laceration has been observed in

[1] Dub. Quart. Med. Journal, vol. i., p. 311.

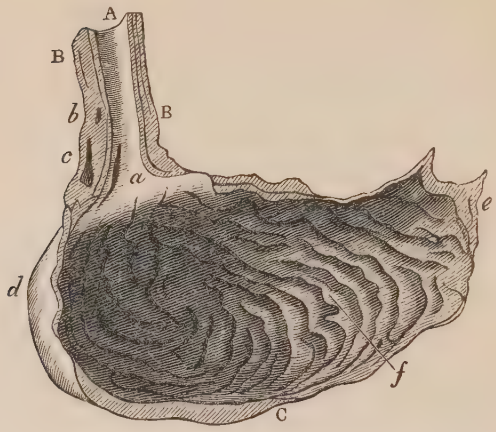

PLATE VI.—c Stomach. *b* Small aperture in left pleura. *c* Large irregular aperture, probably artificial. *d* Fundus of stomach; mucous membrane very soft and dark. *e* Pylorus, near which the membrane is red. *f* Very prominent rugæ.

a perfectly healthy condition of the œsophagus during bodily exertion or violent retching. . . . Perforations and ruptures may occur in either the lower or upper part of the œsophagus, but in the large majority of cases, in the former. . . . The phenomena of rupture are, according to Oppolzer, undefined. Suddenly, during vomiting, there occur severe pain, vomiting of blood, agony, and oppression, whilst the food and drink rush into the mediastinum. We can, therefore, diagnose this disease only when, during a fit of vomiting, violent pain in the course of the œsophagus sets in, when vomiting can no longer take place, and when at an earlier period symptoms had been present which point to an affection of the œsophagus."

CHAPTER VII.

DIGESTIVE SOLUTION OF THE ŒSOPHAGUS.

The occasional occurrence of digestive solution of the coats of the stomach and œsophagus (one or both) has been recognised as a pathological fact since the time of John Hunter, who first showed the real nature of the lesion. Before his time these cases were mostly described as cases of "rupture" of the walls of the tube. Since the time of Hunter's observations many examples have been recorded by various observers. Marshall Hall[1] published a case of *post-mortem solution* occurring in a little girl, which will be again referred to. Carswell, in his "Pathological Anatomy," has paid special attention to this subject. He referred to the agency of the gastric juice all those cases of "*ramollissement gelatiniforme*," of which the French writers of his time talked so much, and he laid down the following points of distinction between the softening produced in this way and that due to inflammation: —"In the inflammatory softening the mucous membrane is opaque, it is transparent in the other: in the former case, when softest, it resembles a mixture of flour and cold water or milk; in the latter, it resembles the same materials after having been submitted to the action of heat. Inflammatory softening never perforates, it only affects the nervous coat; the chemical often goes through all the coats, and even softens the adjacent organs. Inflammation softens the mucous follicles; the gastric juice does not. The stripes and bands of softening are produced by the gastric juice acting on the summits of the rugæ; inflammation could have no such effect." Mr. Wilkinson King[2] published three cases of *post-*

[1] Edin. Med. and Surg. Journal, xxxii., 28.

[2] Guy's Hosp. Report, vii., 1842.

mortem digestion, occurring after various diseases, which attracted much attention.

In most of the recorded cases of "digestive solution" of the œsophagus the opening has been found near the cardiac end. This is what might have been anticipated: and from the anatomical disposition of the parts in this situation it might also be expected that the gastric fluid would sooner make its way into the left pleural cavity. The extravasation may, however, take place into both sides of the chest, as in one of the cases recorded by King. In this case the whole circumference of the tube was destroyed in two places, leaving a ring between of an inch in length, the ends of which, like the upper and lower divided ends of the œsophagus, were soft and flocculent. "As to the circle of œsophagus which was left in this case, it seems attributable to the simple weight of the heart, which might have kept this portion of the tube comparatively empty of the solvent."

The extent of injury which the pulmonary pleura and parenchyma may suffer will vary with the amount of fluid poured out into the chest, the length of time intervening between the period of death and the autopsy, and the temperature at which the body has been kept. It is, of course, the obtuse edge of the lung which is liable to be affected. In the first case related by King, the whole of the edge of the lung was destitute of pleura, which had been dissolved to the extent of about twelve square inches; the alteration being circumscribed by an abrupt margin of flocculent pleura. The surface of the lung thus denuded did not appear otherwise altered; it was of an uniform aspect, rather dark, and under pressure exuded little bubbles of air at all points.

In a case shewn by Dr. Hewitt, at a meeting of the London Pathological Society, the appearance of the surface was such as to give at first sight the idea of gangrene of the lung.

It has been stated by Dr. Budd that "when the œsophagus is thus dissolved or corroded by the gastric juice, the great end of the stomach is dissolved or corroded also." This statement, although it may be accepted as a general rule, is one certainly not without exceptions. In Mr. King's case,

already referred to, the stomach was entire and lined with a considerable layer of mucus. This writer has observed that "sometimes when the œsophagus is much affected, the stomach is less so, and *vice versâ*. The reason of this is, that when by the contraction of the abdomen or stomach the gastric fluid is most driven upwards, less, of course, remains to act on the lining membrane of the stomach, which, being diminished in extent and thickness, is less readily acted on."

A case of "digestive solution" has been published by Canton, which, with some of the observations which he has added, are of peculiar interest. The case was that of a female child, aged six months, who had died comatose. The insensibility commenced two hours after the ingestion of a large supply of breast milk and soaked bread, and continued until death, which occurred in ten hours afterwards. No satisfactory account could be obtained from the parents of any particular ailment under which the child had previously laboured.

The autopsy was made twenty-six hours after death. The body, which was that of a plump, well-nourished infant, had been kept in the supine position, and in a warm room. The posterior part of the trunk and limbs was deeply discoloured by post-mortem gravitation of blood.

The only morbid appearance in the head was a large quantity of clear serum at the base of the brain in the arachnoid cavity. . . .

On raising the left lung carefully from its pleural cavity, the latter was seen to contain nearly two drachms of a sanguinolent fluid, in which were several very small particles of food. No adhesions existed. The fluid being removed, an oval opening was found in the left side of the œsophagus, about three quarters of an inch in length, in the axis of the tube, and commencing nearly a quarter of an inch from the diaphragm. The edges of this opening were thin, flocculent, free, and as it were fringed irregularly. Another aperture, of about a third of the length of the one described, existed in the axis of the canal, but placed a little more towards its posterior part, so that a small strip only of undissolved texture remained to separate the two. The margins of the lesser opening presented the same characters as those of the larger one. On laying open the œsophagus, in the situation of these apertures, the mucous membrane was seen to be filmy, almost diffluent in some parts, and of a roseate hue. The nerves,

externally, were remarkably distinct, and quite perfect. The œsophagus, in the remainder of its extent, was quite healthy.

The obtuse edge of the lung, where it had overlaid the large opening in the tube, was but slightly acted on by the gastric juice; sufficiently so, nevertheless, to account for a ready transudation of blood from it to colour this fluid in the chest.

The stomach was distended by soaked bread, and the coats of the viscus were in every part intact and healthy. The cardiac orifice was contracted, and the diaphragm perfect. The intestines were somewhat inflated.

In his "observations" on this case, the writer remarks:—

A point of some interest in the case I have brought forward is, that whereas the stomach was replete with quasi-solid food, not more had regurgitated into the œsophagus than gastric juice, in which were "several, and very fine, whitish particles of food." The cardia was contracted, and I presume that the gradually increasing post-mortem rigidity of the abdominal muscles, aided by the general, though slight, insufflation of the intestines, and the resistance offered above by the distended pericardium, must have, together, squeezed the gastric juice—being the thinner portion of the contents of the stomach—through an opening which, in its still contracted state, disallowed the passage of the more solid matters. Dr. Carswell observes: "It is when the gastric juice is in great abundance, or the stomach distended with gas, that the cardiac orifice becomes dilated, and this fluid passes into the œsophagus and dissolves it."

The resistance offered by the nervous tissue to the solvent action of the gastric juice is an interesting and curious fact, and has been noticed by Cruveilhier. In a case of perforation, observed by Dr. Marshall Hall, in the œsophagus of a little girl, whose body he examined on the fifth day after death, he found that "the nerves were left entire, and, as it were, beautifully dissected out." He was so much struck with the neatness of this pathological dissection that it led him to suggest that "we might possibly employ the gastric juice in the minute dissection of the nerves, since this texture appears to resist the action of this agent, whilst that of the other parts is destroyed by it." In the case of Mr. King, already referred to, the nerves were, however, a good deal acted on, but they had resisted more than the other tissues.

Humphrey[1] mentions having met with six cases of "digestive solution" in his own practice. He considered it to be due to the gastric juice, acting before death as an irritant, and after death as a solvent. "The position of the body, the development of gases in the intestines pressing upon the contents of the stomach, the non-contracted state of the œsophagus itself, are the causes which produce the passage of the gastric juice into the œsophagus."[2]

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[1] *Vide Med. Times and Gazette*, Jan. 16, 1855.

[2] Habershon, Diseases of the Abdomen, 2nd ed., p. 281.

CHAPTER VIII.

PARALYSIS OF THE ŒSOPHAGUS.

Paralysis of the muscular tunics of the œsophagus, as of other muscular structures, may be either partial or complete; the former being usually due to some transitory nervous affection, while the latter requiring, as it does, for its production, the arrest of function of the vagi nerves, is generally symptomatic of some serious lesion of the nervous centre. This affection was known as long ago as the time of Galen, who described it under the title of *Gulae imbecilitas.* The phenomena which attend paralysis of the œsophagus (pure and simple), can be more satisfactorily observed in experiments made on the lower animals than they could possibly be in disease affecting the human gullet, and have been sufficiently detailed in the first chapter of this essay. The ingesta, not being propelled downwards by the normal vermicular contractions of the walls of the tube, collect and block up the canal completely. Vomiting sometimes follows an attempt at deglutition; sometimes attacks of threatening suffocation supervene, and even convulsions. But the mere difficulty of deglutition, though in itself a serious matter, is not the gravest item in cases of paralysis of the œsophagus: it is rather the central lesion on which the paralysis depends.

Causes.—This affection is seen in the last stage of progressive muscular atrophy, in the general paralysis of the insane, also it is seen co-existing with glosso-laryngeal paralysis, and sometimes it forms a part of the palsy which follows diphtheria. In all these cases it is a very fatal symptom, and the same may be said of those cases in which it arises in the course of fevers and other acute diseases. It sometimes attends an

attack of apoplexy, and in such instances also it must be a symptom of the gravest import, inasmuch as it shows that the effusion must have been copious enough to compress the medulla oblongata, or roots of origin of the pneumogastric nerves. Larrey saw it follow a lance-wound of the posterior lobe of the left hemisphere of the brain. Besides those cases which we have mentioned in which the paralysis is due to a centric cause, others have been from time to time observed in which it was due to some eccentric lesion affecting the nerves in some part of their course. Koehler[1] has recorded a case of paralysis of the gullet caused by pressure of pulmonary tubercles on the vagi nerves. Wilson[2] saw an example in which it was due to the compression of the nerves by a syphilitic node growing from one of the cervical vertebræ. Monro[3] tells us of some cases in which it followed yellow fever, but from the extreme irritability of the parts in those instances there must have been more than paralysis present. In one case the attempt to swallow threw the patient into a state of violent hysterical agitation. A part only of the ingesta found its way into the stomach, the rest was immediately returned by the mouth and nose. Electricity was employed, and proved successful: for some time the patient could swallow only when sitting on the electric stool. Paralysis of the gullet is seen among the insane, in whom it may be first denoted by signs of asphyxia arising during meals. Montant presented to the French Academy of Medicine a specimen in which the paralysis had been caused by the development of a hydatid cyst at the base of the skull.

Symptoms.—The attack, as may be surmised from the list of causes which we have given, is sometimes extremely sudden; in other cases the affection is slowly developed. In a case reported by M. Flandin,[4] which occurred in a patient of apo-

[1] Biblioth. Medicale, xxxiv., 128.
[2] Recueil. periodique, xlv., 53.
[3] Loc cit.
[4] Jour. Hebd., 1831, No. 41.

pletic tendency, the man in proceeding to drink some liquid was suddenly stopped by spasm of the œsophagus. "Malgré plusieurs saignées qui furent faites," contractions of the muscles of one side of the face followed, with embarrassment of speech, and incomplete paralysis of motion and sensation; the œsophagus was completely paralysed. This case recovered under treatment. The following is another instance of this paralysis followed by hemiplegia:—[1]

Miss Cooper, aged fifty-one, had been suffering from tic douloureux of the superior maxillary nerve for months (on the right side). . . . She was suddenly seized with an extraordinary attack of vomiting, accompanied by such nervous and muscular depression, that she could not hold her head up to vomit by her own effort, and when she was supported for a few minutes it brought on syncope. On the following evening she found it impossible to swallow either solids or fluids. This case also recovered under treatment (electro-magnetism).

Diagnosis.—Continued dysphagia, in which solids are more easily swallowed than fluids, and large morsels than small, is characteristic of the incomplete paralysis. When complete, deglutition is impossible, and there is dribbling of saliva from inability to swallow it. It may be simulated by hysteria, and a slight form is said to be caused by alcoholism, rheumatism, and even the use of gargles containing lead (?).

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[1] *Dublin Med. Press*, vol. ix., p. 108.

CHAPTER IX.

SPASM OF THE ŒSOPHAGUS: ŒSOPHAGISMUS.

This affection was first brought prominently under the notice of the medical world by the researches of Mondiere; who, we believe, was the first to use the term *Œsophagisme*, although the credit of giving this name to the disease has been accorded by some to another writer, Vogel. Hoffmann had, however, described the affection before either of them, in a treatise *De Spasmo Gulæ Inferioris* (1733).

Mondiere's definition of "œsophagisme" is as follows:—"L'œsophagisme consiste en une constriction plus ou moins complète et durable du canal pharyngo-œsophagien, et pouvant ou produire une dysphagie absolue, ou empêcher seulement la deglutition des corps solides ou liquides." This writer, however, included under the title of "œsophagisme," spasm of the muscular tunics of the gullet due to inflammation, irritation caused by the presence of a foreign body, &c. We would prefer—what is, we believe, generally done now-a-days—to limit the term to those cases in which there is no organic lesion discoverable, and the existence of the spasm is the only abnormal condition connected with the tube. Accordingly, we shall devote our attention in the present chapter to the consideration of the variety of spasm of the muscular fibres of the œsophagus which is idiopathic in its origin (true œsophagismus); whilst that form which is merely symptomatic of some other affection of the tube has received its due amount of attention in the several chapters which are devoted to the consideration of the various other maladies with which it may be connected.

Œsophagismus is seen only in people of great nervous

susceptibility, and is consequently usually found associated with hysteria in the female, and hypochondriasis in the male. Indeed it is sometimes observed in cases of hysteria to come on with the first development of the symptoms characteristic of the latter affection, and to disappear with their subsidence, without the necessity of any treatment specially directed to the affection of the œsophagus. That curious symptom so characteristic of the hysterical state, the *globus hystericus*, is now pretty well understood to be due to a spasmodic condition of the muscular fibres of the gullet. A precisely similar feeling experienced by a patient suffering from organic disease of the œsophagus has been already described. In the latter case the spasm was of the symptomatic variety, and due doubtless to reflex irritation of the pneumogastric nerves.

In the good old days, when pathology was still in its infancy, Willis believed that the occurrence of the spasmodic affections of the throat, of which hysterical patients so often complain, was due to congestion of the nervous fluids, in the ganglia of the posterior roots of the intercostal nerves.[1] This theory requires no comment in the present state of pathological research.

It is well known that in states of passion or great emotion the functions of the œsophagus are often very much perverted. Shakespeare was acquainted with this fact; we find him making use of such phrases as "his gorge rises at it," and "she begins to heave the gorge." One of the commonest expressions in talking of fits of anger, is to say of a person that "he was almost choked with rage." Mondiere even thought that the spasm of the muscular fibres of the œsophagus, which takes place in a fit of passion, would be sufficient to give rise to inflammation and abscess, and demands "qui n'a resenti dans le fond de la gorge, après un accès de colère, même léger, de lascheresse et de la douleur, premiers phénoménes de l'irritation?"

Dr. Graves relates, under the title of "A Curious Affection of the Organs of Deglutition," two cases of spasmodic and

[1] Op omnia, t. i., De Morbis Convulsivis.

intermitting dysphagia, both occurring in males. The first was a young clergyman of a highly sensitive and nervous temperament. He complained of various symptoms indicating debility and dyspepsia; but what gave him the greatest annoyance was what he described as a painful and convulsive struggle which sometimes took place between the bit he had just swallowed and a something which seemed to resist its further passage downwards. This lasted only a few seconds, but it was very distressing both to himself and to the spectators; for, of course, it usually occurred at meals, and rendered him unwilling to dine in society. In the second case, this kind of spasmodic dysphagia had become so confirmed a habit, that the gentleman never ventured to eat except a glass of water was within his reach, for, in his case, the arrest of the bolus in its descent was instantly followed by an urgent sense of suffocation. This gentleman, who was, it appears, an excellent anatomist, thought that the sense of suffocation was entirely nervous, or, at least, that it had nothing to do with any mechanical obstruction in the glottis arising from the contact of the descending bolus. Dr. Graves observes, that the cause of the disease in both these cases appeared to be an increased, or rather deranged, sensibility of the œsophagus itself.

Dr. Brinton[1] observes that "the difficulty is oftenest seated at or near the pharyngeal end of the œsophagus. Here the patient sometimes complains of a sore spot, over which the food 'scrapes' in its sensibly slow and difficult transit. Sometimes there is felt to be a downright stoppage, followed by the return of the food into the fauces or mouth." Dr. H. Kennedy[2] has also observed the existence of a "sense of soreness" combined with the spasm, which he attributed to a certain amount of irritation, or, possibly, inflammation in the part. And the result of the treatment which he adopted appeared to verify this opinion. He administered the nitrate of silver in the fluid form, with the view of destroying the

[1] *Vide Lancet.* Jan. 6, 1866.

[2] *Vide Dublin Jour. of Med. Science*, April, 1874.

over-sensibility of the mucous membrane, and, to all appearance, it had the desired effect.

In all the cases of this affection which were seen by Dr. Brinton, the history was perfectly characteristic. He observes:—"They are almost always associated with a dyspepsia, which is evidently of gouty origin, is attended with great acidity and loading of the urine with uric acid and urates, and is often connected with tympanitic distension of the stomach and intestines." In illustration of the manner in which the poison of gout may cause it, he observes:—"The careful physical examination of the abdomen constantly shows the striking manner in which the muscular contractions of the digestive canal are influenced by irritations extrinsic to itself; so that, for example, I have often seen intestinal obstruction imitated by spasm originating in renal or hepatic irritation. In these spasmodic strictures, which often interrupt and replace copious habitual eructations of gastric flatus, and still oftener subside the moment such eructations are permitted or re-established, a similar rule seems to me suggested. An acidity or irritation, either coursing in the blood to the walls of the œsophagus inclusively, or developed here with the aid of any decomposing secretions or ingesta which may chance to be present, causes a 'hitch,' a 'spasm' in its muscular wall, analogous to that cramp of the leg or foot which a casual indiscretion of the table can notoriously bring on in many persons. That this 'hitch' should (as it seems to do) specially single out the comparatively less uniform ends of the tube, where its beginning and ending action undergoes a kind of translation as its peristaltic wave comes from the pharynx, and goes to the stomach respectively, seems natural enough. That it should further favour the upper end, where the hitherto voluntary act of swallowing is converted into an involuntary one, with an analagous change of tissue from striped muscle to fibre-cells, is equally intelligible."

He also adds—"I have not found any case of spasmodic stricture resist the treatment proper for the above variety of dyspepsia."

Paget,[1] in the course of some remarks made upon this subject, observes:—"The hysterical or spasmodic stricture of the œsophagus is but the homologue in the œsophagus of that want of harmony between the organs of speech and respiration which produces stammering, and appears to depend on the want of perfect concert between certain involuntary muscles and muscles under the control of the will, which are designed to act in harmony. In the latter case, the muscles of respiration did not act in time and unison with the organs of speech; in the former, instead of the normal contraction of successive portions of the upper part of the alimentary tract from above downwards, which transmits the food regularly from the mouth to the stomach, there occurs an unequal contraction of certain fibres, which, as long as it continues, bars the passage of food as completely as if some permanent obstruction existed. The degree of this contraction varies in different cases: in some it only compelled the patient to take his meals apart, or inconvenienced him whenever his attention was directed to the act of swallowing; while in others it produced contraction so distinct and complete, that the maintenance of life by means of gastric digestion was wholly prevented."

Dr. Foot—who read the notes of a series of four cases of œsophagismus before the Medical Society of the College of Physicians[2]—did not find that hysteria existed in any one of them. "The whole four were of the disposition called 'nervous;' that is, their nervous system was easily impressed, their fears or emotions easily excited; but I had no reason to believe that their symptoms were either feigned or exaggerated, or in any way under their control. . . . The dysphagia was œsophageal and not pharyngeal, and in such cases it is foolish to speak of them as hysterical, in the sense of their being at all under the control of the patient, or within the influence of their will."

In the first of Dr. Foot's cases, the stoppage was referred to a point about two inches below the notch of the sternum;

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[1] *Vide Lancet*, 1870, vol. ii.

[2] *Dublin Jour. of Med. Science*, April, 1874.

in the second, "the mass was stopped short of the stomach by what he described as a lump rising;" in the third, the obstruction seemed to be situated on a level with the thyroid cartilage; in the fourth, the "constriction" was referred to various places, from the thyroid gland downwards. Dr. Brinton, as we have already remarked, found that the difficulty was oftenest seated at or near the pharyngeal end of the tube. The next frequent situation was at the other extremity; and the selection of these two points he attributed to the "translation" which the "peristaltic wave" underwent at these points of transition.

Dr. Foot believes, and, we have no doubt, correctly, that spasm depends immediately on an exalted sensibility of the lining membrane of the œsophagus; the same cause which had been assigned by Dr. Graves. "The successive excitement of different points of the mucous membrane . . . by the food passing from above downwards, provokes a reflex contraction. . . . When the sensibility of the mucous membrane is exaggerated the result may be a spasm," &c.

Causes.—The causes to which œsophagismus is sometimes traceable may be divided into predisposing and exciting. Of the former class, the most common—which is indeed almost universally present—is a highly "nervous temperament." This was present in all the cases of the affection which we have found recorded by various observers. A curious instance of the power of the imagination in such cases, when the attention has been specially directed to the part, is given by Boyer in his "Traité des Malades Chirurgicales." The case was that of an hysterical woman who had experienced a sensation of pain and pricking on one occasion in swallowing a piece of chicken. For three months after this account she could not be induced to attempt to swallow a morsel of any kind of solid food, for fear of being choked. Lentilius[1] speaks of a woman who could never swallow a wafer, although she had never experienced any difficulty in swallowing any other kind

[1] Actes des curieux de la Nature, Ant. vii., obs. xli.

of food whatever. Zimmermann[1] tells us of a priest into whose windpipe some drops of broth accidentally found their way, and from that moment he could never, by any amount of effort, manage to swallow a drop of a similar liquid. A more interesting example of this imaginary affection—inasmuch as it simulated, for the time, that dreadful and mysterious affection, hydrophobia—has been recorded by Barbantini.[2] The case was that of a gentleman who had been bitten by his own dog in attempting to separate him from another with which he was fighting. The wound was a very trifling one, and was completely healed on the third day. The dog in the meantime had absented himself from home. His master then imagined that he must have been rabid at the time that he had received the bite, and this idea acted so powerfully on his imagination, that on the following day he presented all the symptoms of hydrophobia. During the next four days he was unable to swallow either solids or liquids; he had even already had some paroxysms of fury, when at last his missing dog suddenly reappeared. As soon as the animal was led into his master's chamber, and commenced to fawn upon him as he had been accustomed to do, the symptoms of hydrophobia disappeared to return no more.

Whether such an affection could be hereditary must seem very doubtful. Yet there is at least one case on record in which it seemed to have this origin :—

A woman, æt. twenty, of a nervous and irritable constitution, was attacked with *cynanche maligna*. She soon afterwards became a mother, and her health remained delicate for many years, during which time she also suffered from difficulty of deglutition, accompanied by pain and salivation. The affection resisted the various kinds of treatment which were adopted, and although on one occasion she improved for a short time, the dysphagia soon returned with greater intensity than before. Her case now became desperate. She was unable to swallow any kind of solid food, and when she tried with great effort to swallow a cup of any kind of liquid, one part was returned by regurgitation before the other had reached the stomach. The pain which she then

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[1] (Quoted by Mondiere :) Acta. Helvetiæ, ii., 97.

[2] Giornale di Fisica, Chimia, x., 274.

experienced was so acute, that she was frequently seized with convulsions. Her case was now given up as hopeless by all her physicians, when Stevenson was consulted. He proceeded to pass a bougie, which met with resistance, and when pressure was used, the instrument became bent upon itself, but was unable to surmount the obstacle. He then substituted a small sound, carefully oiled. This instrument he succeeded, with a good deal of trouble, in getting beyond the obstacle, after which it passed easily to the inferior part of the tube, where it met with a second obstruction, which was also surmounted. When the pain and the irritation which it had produced were allayed, the patient found that she could swallow liquids without difficulty. The operation was soon repeated with a sound of larger size, at intervals of some days, and after the fourth introduction, the patient was able to swallow, without the slightest inconvenience, all kinds of solid food, and the symptoms never reappeared.

The daughter, after whose birth the difficulty of swallowing had commenced, was now twenty years old, of a nervous constitution, and had been, ever since her birth, tormented almost constantly by the same affection as her mother. The same treatment was now used, and met with a like success.[1]

The treatment which was found so successful in the above cases reminds me of a similar one which was used by Sir Philip Crampton.[2] One of his patients, a lady, who was afflicted with this œsophageal spasm, always applied to him, whenever she was going to dine out, to have a probang passed, which enabled her to enjoy the hospitality of her friends in a manner that would have been impossible without this proceeding.

Another curious fact connected with this affection is one which the writer of the present essay has heard Dr. Foot remark to his class at his clinique in the Meath Hospital: it is, that œsophagismus is almost always, if not invariably, found in persons of *low stature*.

A great many of the recorded cases of spasmodic affections of the œsophagus have been observed in patients of *gouty habit*.

A case has been recorded by M. Trolliet in which it was

[1] Quoted by Mondiere, Arch. Gen. de Med., t. i., ii^e. serie.

[2] *Vide Dub. Jour. of Med. Science, loc. cit.*

associated with, and seemed to depend upon, *rheumatic* affections of other parts of the body. He described the spasm as the "globe antiperistaltique" of the œsophagus.

Sir E. Home met with one case in which the spasm had existed from the time of birth, and was associated with a *congenital* malformation of the tube.

If the acts of mastication and deglutition were slowly and circumspectly performed, all went on pretty well; but if the mastication had been imperfect, or if the patient swallowed hurriedly, spasm of the œsophagus supervened, attended by a sense of suffocation.

Of the *exciting* cause, to which the occurrence of the spasm is attributable in various cases, a long list may be enumerated. Of Dr. Foot's four cases, one followed a *squeeze of the throat*, another came on during *intense grief*, a third was believed by the patient to be due to *cold*, for one case there was no assignable cause. Fits of passion or *violent emotions* are certainly a frequent exciting cause—as Dr. Foot has remarked, "It is well known that in emotional conditions the functions of the œsophagus are very liable to perversion, the difficulty with which an angry child swallows the cold water prescribed for its temper is an illustration." The spasm may be also brought on by the deglutition of irritating articles of food. Hoffman[1] states that it is often attendant upon inflammation of the upper portion of the spinal cord. It is also an occasional symptom of that curious condition (rather frequently met with in high life now-a-days) known as "spinal irritation." A case of this kind occurring in the person of a negress has been published by Dr. Cain, of Charleston:—

Tipsey, *æt.* thirty-two, was of a highly nervous disposition, and subject to dymsmenorrhœa and asthma, both spasmodic and catarrhal. She had for some time experienced difficulty of deglutition when either solids or fluids were taken. The obstruction was referred to a point about four or five inches below the glottis, or opposite the upper part of the sternum. The morsel was here momentarily arrested in its passage downwards, and caused considerable soreness, and sometimes even

[1] De Spasmo Gulæ Inf.

acute pain. Under treatment she improved. . . . . About two months later she had a dreadful attack of spasm of the trachea, larynx, and œsophagus, which were so severe as to cause her to cry out. . . . . She had been several times treated for spinal irritation, and on learning this fact, Dr. Cain examined the spine, and discovered that there was tenderness over the spinous processes from the sixth cervical to the fourth dorsal vertebra. Treatment, directed to the spinal affection, cured the spasms completely.

It may be caused by the irritation of excessive retchings or vomitings, by worms ascending from the stomach, and it has been said to arise in cases of inanition. It frequently depends on the reflex irritation caused by the diseases of other organs. Affections of the stomach are those to which it is most frequently traceable; and the cases which originate in this way have been compared by Mondiere to the spasmodic closure of the urethra, which is sometimes observed in cases of inflammation of the bladder. Bettali has recorded a case in which it was caused by the presence of a tape-worm.[1] It sometimes seems to depend simply on an overloaded state of the intestines. Abernethy treated a lady who was believed to have an organic stricture of the œsophagus: she had long suffered from difficulty in deglutition; and, while taking food, was always obliged to take some fluid with each morsel, in order to make it descend into the stomach. Abernethy, having regard to the digestive disorder, which was evidenced by the frequent vomitings, and the constipation, from which the patient suffered, proceeded to clear out the bowels by the aid of his never-failing *blue-pill* and some other purgatives, under the influence of which the œsophagismus rapidly disappeared; but so closely was it connected with the state of the intestines, that it returned whenever the intestinal contents were allowed to re-accumulate.

Bouteille[2] saw an instance in which the spasm was caused by worms which were developed in the ear. Courant[3] saw

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[1] Biblioth. Medicale, xxxii., 109.
[2] Biblioth. Medicale, xvi., 246.
[3] Journal Universel, xxxix., 287.

this affection arise in the course of difficult dentition, and persist in spite of treatment till the infant die of inanition. It occasionally occurs in the course of pregnancy, of which Riedlin[1] has recorded an instance. In his case, the woman was tormented during the last months of gestation by a spasm of the œsophagus, which prevented her from swallowing any kind of solid food. It disappeared immediately upon the birth of the child. Œsophagismus is also frequently found to be dependent on other affections of the genito-urinary organs. It was clearly traceable to diseases of the uterus in cases recorded by Gelcen, Burdin, Mondiere, &c. The latter met with a case co-existing with chronic metritis and menorrhagia, for the latter of which he was consulted. Under the treatment directed to the uterine affection, the spasm of the œsophagus completely disappeared.

A lady consulted Sir B. Brodie who was unable to swallow the smallest morsel of solid food, and swallowed liquids only with great difficulty. The symptoms had been coming on for upwards of three years. A full-sized œsophagus bougie, when introduced, entered the stomach without meeting the slightest impediment. This lady's face was pale and blanched; her feet œdematous. She had long laboured under internal piles, from which repeated discharges of blood had taken place. Under the use of remedies which relieved the piles and the bleeding, the difficulty of swallowing disappeared.

The cases of this kind which came under the observation of Habershon[2] were all associated with leucorrhœa, or dysmenorrhœa, and digestive derangement. We have already mentioned that Brinton found it always connected with dyspepsia of the gouty variety.

Mayo[3] met with a case in a female between fifty and sixty years of age, who also laboured under symptoms of inflammation of the peritoneal covering of the liver; "the treatment

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[1] Leonard, De l'Allaitment.

[2] Diseases of the Abdomen, 2nd ed., p. 19.

[3] Outlines of Human Pathology, p. 281.

which removed this complaint, took away the spasmodic difficulty of swallowing."

Mondiere[1] saw a case in which the spasm was caused by ulceration of the larynx; and Howship[2] has recorded two such, in one of which pulmonary phthisis also co-existed.

Portal[3] cites an instance in which a lady perished after having for a long time suffered from difficulty of swallowing—especially liquids—which were often rejected through the nostrils. At the autopsy the seat of disease was expected to be found in the pharyngo-œsophagean tube, but the parts here were perfectly healthy. The pericardium was found of a violet-red colour, and adhering to the heart by false membrane. The same writer informs us, that he has seen instances of spasm of the œsophagus occurring in patients who had suffered severe pain during operations, or during parturition.

Grapengeisser[4] says that he has seen it caused by electricity, and Habershon[5] has seen instances occurring after violent thunder-storms.

It has been seen to arise from the effects of fright or terror; and a good example of the influence of the imagination over the action of the œsophagus is seen in the impossibility of swallowing, or even the forcible rejection through the nostrils of a substance, when disgust is conceived towards it, as in the attempts to take disagreeable medicines by children, or even grown-up persons. Some striking examples of the imaginary nature of some of these affections of the œsophagus have been already narrated, and the following may be added. This case is especially interesting from a diagnostic point of view:—

"Nelaton[6] called the attention of his class to a man of vigorous tem-

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[1] Arch. Gen. de Medicine, xxxi., 473.
[2] Practical Remarks, &c., p. 152.
[3] Mem. Scer. div. Maladies.
[4] Copland's Dict.
[5] Diseases of the Abdomen, &c.
[6] *Vide Dub. Med. Press*, li., 411.

perament (age thirty-five), and in good health. He came into the hospital with the idea that he had a foreign body in the œsophagus. A fortnight since, while picking his teeth with a piece of wood, he was suddenly spoken to. His attention was turned away for an instant, but at the moment he was about to make a reply, he perceived a perfect sensation of a foreign body at the left side of the pharynx. The practitioner, who was at once called in, recognised the foreign body at the point indicated, and made some vain attempts to remove it. Extremely little pain followed, but, as this afterwards increased, he came into hospital. Nelaton suspected from the narrative, as it turned out to be the fact, that no foreign body existed, and cautioned his hearers that they should be very circumspect in making these examinations, as it not unfrequently happens that an unpractised finger mistakes the upper edge of the cornu of the os hyoides for the body supposed to have been swallowed. Usually these nervous symptoms disappear at the end of three months under suitable treatment; but M. Nelaton referred to a case in which they manifested a much greater tenacity:—

"A lady, about six months since, being about to drink some water sweetened with syrup, and not liking the appearance of the latter, placed a single drop on the tip of her tongue, and discovered it to be a solution of potash. Immediately, and notwithstanding that the drop had never been swallowed, she perceived a pain at the lateral part of the pharynx, which was accompanied by an absolute impossibility of swallowing. The pain has diminished, but so difficult has deglutition continued to be, that the patient requires an hour to swallow a simple cup of broth, while the passage of the smallest solid body is still absolutely impossible. It was believed that she was the subject of stricture of the œsophagus, until Nelaton, being consulted, passed down the largest bougie with great facility."

The influence of violent retching in inducing spasm has been already mentioned, and the following cases will serve to illustrate this point. Sir E. Home gives one example in his "Practical Observations on the Treatment of Strictures in the Urethra and the Œsophagus":[1]—

"A woman, about twenty-five years of age, of an irritable habit, but in very good health, came over from Ireland in the packet; the motion of the vessel made her extremely sea-sick, and she retched for several hours; the effects of the retching were a difficulty in swallowing, and tenderness in the whole canal of the œsophagus. The difficulty in

[1] Vol. i., p. 541.

swallowing increased, and in some months after was so great, that she consulted me about the best mode of relieving it. A bougie was passed, the point of which was nearly the size of the little finger, becoming gradually larger towards the other end; this with some difficulty went into the stomach, and the next day she swallowed much better. As the stricture, from this examination, proved to be principally spasmodic, she was advised occasionally to have a bougie passed, . . . and by following this mode of treatment has been very much relieved."

Another example is quoted by Mondiere (from Carron) of spasm following prolonged vomiting. The patient was of gouty habit.

Symptoms.—The characteristic symptoms of a case of œsophagismus have been admirably summed up by Dr. Foot in the following sentences:—"The diagnosis of this affection is based upon the suddenness of its occurrence, the variability of its intensity with various kinds of food, its intermittence, the co-existence of other symptoms, especially hiccough; the absence of other causes of dysphagia—mechanical, inflammatory, or paralytic. The œsophageal vomiting in these cases is manifestly different from gastric vomiting, in the absence of nausea, and of contraction of the muscles of the stomach or abdomen, nor has the returned food any sour or acid taste." One of his own cases may be taken as a typical example of this affection. There was no assignable cause in this instance but "cold." The patient was a "pale, timid-looking lad of sixteen":—

His appetite was good, and he had the wish to eat, but was frequently baffled in his attempts to swallow. He referred the stoppage to a point about two inches below the notch of the sternum; the cause of the stoppage he spoke of as a "lump," which rose to this point from some part further down; and he said that sometimes he could get this lump down by drawing a full breath. Before actual stoppage of the food had occurred, its passage through the œsophagus used to be attended with rattling and roaring noises. He could not swallow any liquid if cold; cold milk or water could not pass, but warm milk or tea could; he had great difficulty in swallowing any "sticky" substance, such as stirabout. He could not eat bread and butter; the first thing that regularly stuck in his throat was a piece of bread and

butter. Even bread and milk was often stopped; he subsisted principally on warm milk and tea. The difficulty of swallowing was greater at some than at other times; he found it always worse when he was hungry. When the stoppage occurred, if the bread was not pushed on by a warm mouthful of milk or tea, and he tried to send it on by forcible voluntary efforts, he very seldom succeeded in doing so; on the contrary, his eyes filled with tears, and the food was pushed back into his mouth. He found that it was of no use to try to force it on into the stomach; it was better to let it wait awhile, as it often then went on of its own accord. The bit has remained in the œsophagus as long as an hour before it got into the stomach. This resistance to the passage of food was unattended with pain, though accompanied with many disagreeable sensations. When the food had returned, it was mixed with much mucus; it never had any acid taste; he felt sure it had never passed into the stomach; he used to know quite well when it did so, and upon such occasions used to give a sigh of relief and satisfaction at the conclusion of his struggle. The food was sometimes returned with such force as to come through the nose.

There is no other form of dysphagia which can be produced so suddenly as this, and its occurrence for the first time during the course of a meal has been sometimes mistaken for the impaction of a foreign body, which is the only other circumstance producing an instantaneous obstruction to the passage of food. "Le spasme de l'œsophage," says Mondiere, "survient ordinairement tout-a-coup, souvent même au milieu d'un repas et dans un état de santé parfaite." The distinctions on which Brinton relied to distinguish this affection from true organic stricture of the gullet are the following:— "Where regurgitation takes place, it is, in my experience, almost *immediate:* the food is flung back by a spasmodic tube, not falteringly passed along a variable segment of a diseased one, or gradually arrested as it nears the stricture, to accumulate above the ring. So far as I know at present, the passage of a bolus down the tube, to sojourn there some forty or fifty seconds (the average time) before its return, is almost characteristic of true stricture. Another curious (and in some degree distinctive) feature is, that the passage of liquids is, in occasional instances, much more resented than that of solids. Both ulceration and organic stricture are, of course, contrasted with spasmodic stricture in this respect."

Mondiere found the symptoms to vary according to the part of the tube affected. "Lorsque le spasme occupe le pharynx ou la partie supérieure de l'œsophage, la déglutition est tout-à-fait impossible, les alimens sont rejetés de sa suite et avec force. La déglutition s'opere, au contraire, lorsque la constriction existe dans un point rapproché de l'estomac; mais arrivé à ce point, le bol alimentaire est arrêté; et peut, ou séjourner long-temps dans l'œsophage, ou être bientôt ramené dans la bouche par un mouvement de régurgitation." This regurgitation is sometimes followed by an acute pain, which, commencing at the pharynx, passes downwards to the stomach.

Sometimes the patient finds that by chewing the bolus carefully and slowly he now and then gets an opportunity of swallowing without encountering the usual resistance. Courant[1] has recorded a case of this kind in which the patient, by watching for the favourable moment, "*ut, si ita loqui fas est, gulæ spasmum falleret,*" was able to swallow liquids and even solids.

The arrest of the bolus is sometimes accompanied by very severe symptoms. Thus Hoffmann[2] saw a case in which the patient suffered the most violent anguish, on the arrest of a morsel which he could neither wash down with liquids (which he usually succeeded in doing), nor reject by regurgitation. Mondiere quotes a case in which the attempt to swallow the smallest quantity of liquid brought on the most violent spasms, which obliged the patient to cling to the bed, and bend his head forward; the face at the same time becoming of a livid colour.

Besides the symptoms which are present only when the patient attempts to swallow, there are, in most cases, some others of a less prominent type which are present in the intervals.

A sense of uneasiness is often felt in some part of the course of the gullet; the feeling is usually one of *constriction*, and is generally felt at the upper extremity of the tube. In

[1] De nonnullis morb. convul. œsophagi. [2] De Gulæ Spasmo.

one of Dr. Foot's cases which followed a "squeeze round the neck," the patient when in hospital still spoke of a "squeezing sensation about the neck, on a level with the thyroid cartilage." Sometimes this sensation leads to a fear of suffocation, or gives rise to a continual hawking; sometimes even to frequent violent retchings, accompanied by the discharge of a great quantity of limpid mucus.

The sensation of a "*lump rising*" which was present in the case quoted at page 106 is a frequent accompaniment of œsophagismus. Hoffmann[1] once had a patient under his care who felt, particularly during the night, the sensation of the presence of a *pigeon's egg*, sometimes at the lower extremity of the œsophagus, sometimes at the upper.

Hiccup is also a frequent symptom. Great thirst has also been observed in some cases.

A great variety exists in different cases with regard to the particular kind of aliment which is most difficult of deglutition. In most cases liquids are much more easily managed, but the contrary is sometimes the case, and the same difference has been observed to exist with regard to hot and cold articles of food. The former are, as a rule, by far the more easily got down, as we should naturally expect in a spasmodic affection, yet Monro[2] cured spasmodic stricture of the gullet by means of ice and cold liquids, and Mondiere quotes some other cases treated successfully in the same manner. Courant[3] saw a case in which solids found their way along the tube without the slightest obstruction, while liquids were either completely stopped in their course or only found their way into the stomach drop by drop. Sour articles of food are usually the most unmanageable of all.

The spasm which is induced by the attempt to swallow is in some cases propagated to the organs of respiration also; and then there is, superadded to the other distressing symptoms, a feeling of impending suffocation, which continues so

[1] Loc. cit.
[2] Morb. Anat. of Gullet, &c.
[3] Loc. cit.

long as the bolus remains in the gullet. During this time, the voice is lost, and the breathing is performed by a succession of sighing respirations, with long intervals between. —(Mondiere.)

The period of time during which the spasm lasts is indefinite. It is usually very short, the relaxation succeeding rapidly, and allowing the bolus, if not rejected by the first contraction of the tube, to descend easily into the stomach. A case has been, however, recorded by Osterdyk :[1] the spasm in which continued without the slightest remission for twenty-four hours.

Prognosis.—Œsophagismus is rarely a fatal affection, yet some cases have been recorded, in which it actually resulted in the death of the patient. An example of this termination has been already given, and another will be related in the chapter on Œsophageal Dysphagia.

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[1] Quoted by Mondiere, loc. cit.

CHAPTER X.

MORBID GROWTHS IN THE ŒSOPHAGUS.

New growths of various kinds are occasionally found in the gullet, where they necessarily, if of any considerable size, give rise to serious symptoms. The conditions under which warts and polypi are formed have been already explained.

Tubercles are sometimes, though indeed very rarely, found in the submucous tissue. They are occasionally mentioned, as occurring in this situation, by the older pathologists, but Rokitansky doubts that they are ever seen here. An example will, however, be found detailed in the chapter on "Œsophageal Dysphagia."

Myoma of the Œsophagus.

This variety of tumour is exceedingly rare in the œsophagus. Virchow showed that it was occasionally met with in this situation, and collected a few examples. In the principal one of these, the growth was five lines in diameter, and was situated near the cardiac end of the tube. It projected rather towards its exterior, and had not caused dysphagia during life. But the best example of myoma of the œsophagus on record is, probably, that which was exhibited to the London Pathological Society, by Mr. Hilton Fagge, on November 17, 1874.

The specimen was taken from the body of a man, *æt.* thirty-eight, who had died in Guy's Hospital, under the care of Mr. Bryant, partly from bronchitis and emphysema, and partly from the effects of an injury to the knee-joint. "*There was no mention of dysphagia* in the clinical history." At

the post-mortem examination, a large tumour was found growing from the anterior wall of the œsophagus, just below the bifurcation of the trachea. It lay in the coats of the tube, and "it seemed to be in the angular space between the two bronchi it appeared." When the œsophagus was opened it

Plate VII. represents the œsophagus laid open from behind, and the tumour divided by a vertical section.

seemed to project greatly into the interior of the tube. The tumour was egg-shaped, and its long axis lay obliquely with

regard to that of the canal. It was two inches in length: its other diameters were, an inch and a quarter, and an inch, respectively. The surface beneath the mucous membrane was smooth and rounded, and the membrane was freely movable over it: the surface beneath the longitudinal coat was slightly nodulated. The muscular fibres could be followed down over the tumour for some distance, and part of it was inseparably adherent to them.

The tumour itself was of a tough whitish substance, marbled with striæ of a whiter colour. It looked dry and fibrous, and yielded no juice on scraping; in fact, it looked like a myoma of the uterus. Microscopical examination showed that it was composed of smooth muscular fibres, arranged in bundles crossing one another in all directions, and in which acetic acid brought out very distinct rod-shaped nuclei.

A strange feature, at first sight, in this case is, the absence of dysphagia. But the fact that the tumour projected principally in front may account for it.

Carcinoma of the Œsophagus.

Cancer of the œsophagus is not only the most fatal, but, so far as can be judged from recorded cases, the most frequent in occurrence, of all the diseases of which this organ may be the seat. The number of fatal cases of œsophageal disease which are to be found scattered up and down in the various journals, and in the records of the transactions of the different Pathological Societies, have been for the most part of this nature.

Cancer of the œsophagus may be epithelial, scirrhus, or medullary: the first of these forms is said to be the most frequent towards the upper end of the tube, the second towards its cardiac extremity. The disease usually occurs in the primary form, although the organ may, of course, become involved in the progress of a case of diffuse mediastinal cancer, as was well shown in a specimen exhibited to the Society during the present session by the president, Dr. Hayden. It

is also usually found in a solitary form; that is to say, it rarely spreads to any of the neighbouring organs, but limits its action to the walls of the tube itself. In the experience of Rokitansky, the lower end of the pharynx and the upper part of the thoracic portion of the œsophagus, are the most frequent seats of the carcinomatous degeneration: and Rindfleisch has found that the middle third of the tube is the portion which is most frequently selected for the display of the ravages of that destructive process. Hunter believed that the pharyngeal end of the tube was most frequently affected, and thought that the fact could be explained by the greater amount of irritation to which this portion of the tube was exposed—in the deglutition of hard morsels of food, &c.—as the wide and roomy pharynx passed into the comparatively narrow canal of the œsophagus. Rindfleisch would also offer an anatomical explanation of the most frequent occurrence of cancer in the *middle third* of the tube. "The left bronchus, as is well known, crosses the œsophagus in its middle third," which, he believes, causes this portion of the tube to be exposed to a greater amount of pressure than any other part. "Every morsel of considerable size, in passing down the œsophagus, squeezes its anterior wall against the posterior wall of the unyielding bronchus."

In whatever part of the course of the œsophagus carcinomatous disease makes its appearance, it almost invariably affects the whole circumference of the tube, and this causes the formation of an annular stricture, the extent of which must correspond to that of the morbid deposit. The dysphagia which results is sometimes the cause of the fatal termination, which is more rapid in this than in other forms of stricture, from the cachectic state of the system which accompanies it, in common with other varieties of cancerous disease. The affected portion of the œsophageal wall is found to be thickened, hard, and irregular on the surface, and in case of scirrhus, the form in which this thickening and increase of substance is most marked, the tissue is sometimes so dense as to be cut with difficulty, even with a sharp knife.

It is worthy of remark, however, that in cases of cancerous

disease of the œsophagus the fatal issue is but seldom directly caused by inanition, but is in the great majority due to the complications. The most frequent complication is, perhaps, pneumonia, which is due in many instances to destruction of one or both pneumogastric nerves, which is rapidly followed by consolidation of one lung or both, as the case may be. It is also sometimes set up by extension of the disease from the œsophagus into the tissue of the lung itself. The sloughing of the cancer is also sometimes followed by septic changes in the blood, which is followed by pneumonia. In twenty-one cases of cancer of the œsophagus which have been collected by Habershon, the causes of death were as follows:—

In eleven cases there was pneumonia; *one* was acute and chronic, the pneumogastrics being free; *two* were chronic pneumonia, with sloughing of the œsophagus, in one of which there were cancerous tubercles in the lungs; in the other, a communication between the trachea and œsophagus. In *seven* the pneumonia was acute—three from direct extension of disease to the lung, and four from injury to the pneumogastric nerves. *One* was strumous pneumonia, with cancer of the pharynx.

In four cases there was gangrene of the lung.

In one there was acute bronchitis and laryngitis.

In one there was pleurisy and disease of the kidneys.

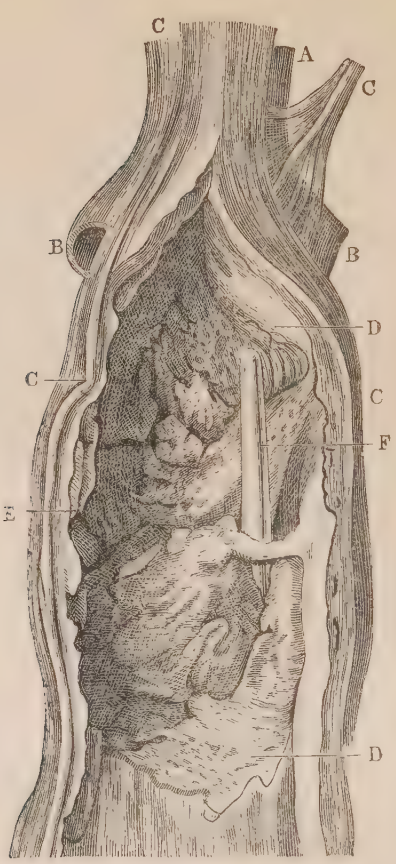
In one there was cancer of the lung with extreme congestion.

In two death took place from inanition; in one of these, however, there was chronic bronchitis, in the other lobular pneumonia.

In one fatal hæmorrhage took place from perforation of the aorta, but the lung was also involved.

Among these instances, the longest period which elapsed between the commencement of dysphagia and death was about two years, several were from three to seven months, and in two still less, the intervals being only five and seven weeks. The pneumonia, which follows destruction of one of the pneumogastric nerves, is likely to be rapidly followed by gangrene or sloughing abscess, as might be expected from the loss of innervation.

When the cancer has proceeded to ulcerate or slough, death may result from any of the complications which we have seen to arise from perforation of the œsophagus. Numerous cases



Explanation of PLATE VIII. (copied from PLATE IX. of Munro's "Morbid Anatomy of the Gullet," &c.) :—"The drawing from which this very highly finished engraving was taken, was copied from a very fine preparation of cancer which occupied the greater part of the gullet, and is preserved in the Museum of Mr. Heaviside, of London."

AA, part of the windpipe. BB, the larger branches of the windpipe, called by Anatomists Bronchi. CCC, the gullet, the coats of which are very much thickened, unequal, and rugged. DD point out small ulcers on the villous coat. E, opposite to this letter the gullet exhibits the genuine characters of cancer, and a number of fungous excrescences, of different sizes, grew from the inner membrane; and several of those next to the aperture through which the quill has been passed, were in a state of ulceration.

have been recorded of fatal hæmorrhage from extension of the cancerous ulceration laying open some one of the great vessels in the neighbourhood, or establishing a communication with some portion of the air-passages, or causing profuse suppuration in the surrounding cellular tissue. Mondiere quotes from Keppelhont a case in which ulceration of the cardia and œsophagus communicated with an abscess of the liver; and also, from Dr. Anesant, an instance of scirrhous ulceration of the interior of the œsophagus, which proved fatal by extension to the spinal cord. According to Wilks and Moxon the destructive process proceeds more rapidly when it engages the anterior wall of the tube, "involving fiercely the lungs and windpipe." But they think that this may be merely an accident, owing to the slighter degree of pressure in this direction. These gentlemen have also twice seen general suppuration of the tissues of the neck follow perforation by cancer. The pericardium has also been known to be perforated, with the result of a rapidly fatal pericarditis. Sometimes the cancerous ulceration extends through the diaphragm after destroying the œsophagus. This took place in two of the cases given by Habershon. In one the œsophageal opening into the stomach remained, but a large sloughing cavity was formed, bounded by the pancreas, spleen, and diaphragm, which communicated with the posterior mediastinum by an opening in the diaphragm. Immediately behind the pericardium was a large sloughing cavity, presenting above the truncated œsophagus and pneumogastric nerves, and terminating below, as just described. In this case there was a remarkable absence of dysphagia.

Symptoms.—The symptoms which accompany carcinoma of the œsophagus are, in the early stages, those of organic stricture of the tube, usually followed later in the course of the disease by those proper to ulceration, or any of the other complications which we have seen to arise in the progress of these cases. Accordingly, dysphagia is in most instances the earliest and the most prominent symptom all through. According to Habershon, "in organic obstruction of the

œsophagus, and especially in that of a cancerous kind, the dysphagia is very peculiar; the patient hesitates in making the attempt to swallow; he takes a considerable time, as it were, to prepare the muscles of the pharynx for the effort, and when the attempt is made, the food or fluid is at once rejected, and sometimes severe suffocative cough is produced." Hæmatemesis is sometimes a symptom of cancer of the œsophagus: this is only present after ulceration has taken place, and eroded some of the small vessels. The dysphagia in some cases does not become extreme till the ulceration has formed communications with the air-passages, or has extended into other structures: it then leads to symptoms which almost mask the original disease. Pain is also more constant than in simple stricture of the tube; it is hardly ever absent, but it varies greatly in intensity. It is usually of a dull and burning character, and is felt at the same time in the upper part of the throat, and also behind the sternum, and in the back at the level of the seat of the disease. When the trachea or bronchi are involved, a new set of symptoms are, of course, developed. Aphonia may be present even where the larynx has not been engaged, as was observed in a case of Dr. Barton's, of which he exhibited the morbid specimen to the Society on November 26, 1870. The central portion of the œsophagus was engaged in a mass of scirrhous cancer; the larynx was free from disease; yet the earliest symptom observed was hoarseness, which was soon followed by complete loss of voice.

The patients who are the victims of cancerous disease of the œsophagus are generally beyond the middle period of life: failure of nutrition is more marked, and the emaciation more rapid, than in other varieties of œsophageal obstruction. Travers[1] thus describes in a few pithy sentences the pathology and symptoms of cancer of the œsophagus:—"Scirrhous strictures, followed by ulceration and cancerous fungus, are met with in the pharynx and the top of the œsophagus in

[1] Med.-Chir. Trans., xv., 252.

elderly persons, chiefly females, in my experience. They are productive of constant nausea, dry burning sensation in the throat and stomach, difficult breathing, frequent spasms, and alarms of suffocation, and excessively impeded deglutition; upon the gentlest introduction of the finger or bougie, hæmorrhage follows, which afterwards becomes spontaneous. The patient has a faded sallow countenance, a disturbed circulation, and is emaciated to a skeleton."

Diagnosis.—Carcinoma of the œsophagus must be distinguished from simple stricture of tube, and also from ulceration, compression by tumours, &c. The rapid progress of the former, and the accompanying cachexia, will serve to distinguish it, in most cases, from the two first-named conditions. But in the progress of cancerous disease ulceration very often takes place, which may lead to greater difficulty in the diagnosis. In compression from without there is hardly ever complete obstruction; besides, there will be signs of pressure on other organs in cases of this description. The special characteristics of each form of "dysphagia" will be fully dwelt on in the chapter on that subject, when examples of each variety shall be given.

Sarcoma of the Œsophagus.

Of this form of morbid growth we have been able to find but one recorded case occurring in the œsophagus. This was published by Dr. J. Rosenbach.[1] The patient, a full powerful man of forty-five years of age, attributed his complaint to catching cold in the neck. There was a dry feeling in the right side of the neck, and a disagreeable sensation of a foreign body in the throat. The symptoms gradually increased in severity. Difficulty of deglutition, and afterwards difficulty of respiration, came on, and the voice was almost lost; it sounded as if the mouth were full. His sleep was disturbed by dreams, in which he imagined himself at work, and the move-

[1] Berliner Klinische Wochenschrift, Sep. 20 and 27, 1875.

ments he made or imagined brought on feelings of suffocation. Sometimes sudden movement brought on vomiting, which gave temporary relief. . . . . On depressing the tongue, an irregular swelling of some size, covered with whitish mucus projected over its back. Exploration with the finger stopped his breathing so much that tracheotomy was at once performed . . . . . The tumour was found to be attached at the right side of the œsophagus, just below its junction with the pharynx. It was pinkish in colour, soft, lobulated in form, and almost transparent; its appearance, indeed, was much like that of a common nasal polypus. The bulk was that of a common fowl's egg.

Subhyoidean pharyngotomy was performed, and the tumour removed. The structure was found to be that of a round-celled sarcoma.

CHAPTER XI.

FOREIGN BODIES IN THE ŒSOPHAGUS.

The effects which follow the lodgment of a foreign body in the œsophagus are of the highest importance both to the pathologist and to the medical practitioner. To the former they are of the highest interest, as almost every disease to which this organ is subject will be found in some cases to owe its origin to the impaction of a foreign body in the tube; while to the latter the importance of the subject is still more obvious, from the fact that of all the symptoms connected with the œsophagus which he is called upon to treat, the most frequent, probably, and certainly in some cases the most urgent, are those which come under this head. From these considerations, we believe that it will be well to devote a considerable amount of attention to this portion of the subject.

Under the heading of "foreign bodies in the œsophagus" we include all substances which either (1) introduced from without, or (2) formed in the system, become lodged in the tube, and give rise to symptoms more or less grave. The second class makes but a very small proportion of these cases. The only instances which come under this head are those in which worms ascending from the stomach have formed the foreign body. They may either have found their own way into the gullet, or have been brought up in the act of vomiting. The presence of these parasites in the œsophagus is probably not so rare as is generally supposed. Meplain,[1] in the examination of the bodies of forty-four children who died from the effects of worms, found that, of twenty-nine who had died in convulsions, seven had worms in both stomach and œsophagus,

[1] Jour. Complem. xvii., 372.

four in the œsophagus alone, seventeen in the stomach alone, one in the nasal cavity; while in the fifteen cases which had not been affected by convulsions, the worms were all found in the lower part of the alimentary canal. M. de Laprade[1] has recorded a case where, on examining the body of a mason who had died suddenly, a large bundle of lumbrici were found in the œsophagus on a level with the thyroid gland.

The first class of cases which we have mentioned, and which comprises the vast majority, may also be divided into two very unequal varieties. (1) Those in which the foreign body becomes impacted in the tube in its passage from above downwards in the act of swallowing; (2) when it has become arrested in the ascent from below upwards in the act of vomiting. Very few examples of the latter have been recorded. Houillier[2] mentions two instances: one was that of a young girl, who, after cramming herself with "poumon de bœuf," was seized with violent vomiting, in the course of which a morsel became impacted in the œsophagus, and gave rise to very severe symptoms, which were only relieved when the morsel had been rejected after violent efforts. In the second case, which happened in a similar manner, the symptoms were still more severe, and suffocation, for a time, appeared imminent. With these few instances we shall dismiss the consideration of the rarer forms.

The substances which, in various instances, have become impacted in the œsophagus during the act of deglutition, present an almost endless variety in their nature, volume, consistence, shape, &c. Pieces of meat, of vegetables, crusts of bread, fragments of bone, bits of gristle, fruit-stones, coins, stones, nails, knives, forks, spoons, pins, pieces of wood, sponges, rings, bracelets, scissors, keys, a ladle-handle, a sword-blade, a brace-buckle, a gold watch and seals, even living leeches and certain small fishes, have all been enumerated. The improvements of modern surgery have not been

[1] Compte rendu des Travaux de la Société de Médecine de Zyon, 1821.

[2] Acad. de Chirurg., i., 456.

an unalloyed blessing in this respect, and sets of false teeth are now-a-days about the most frequently-occurring foreign bodies found in the œsophagus. From our description of the anatomy of the canal, it will be easily understood, that it is at either extremity that a foreign body is most likely to become arrested, as it is at these points that it presents the smallest calibre. When a body passes the upper opening, it probably descends, without further obstacle, till it arrives at the point where the tube passes through the diaphragm. In passing through this portion of the canal it is very likely to be obstructed; and another point of obstruction will be met with at the cardiac orifice where the circular fibres of the tube are strongly developed, and so arranged as to form a sphincter for the opening. We should also observe, that so long as the foreign body is passing through that portion of the tube which lies in contact with the trachea, its passage is not quite so free as it will be in the lower portion of the canal; and in this situation it is also much more likely to set up reflex spasm of the tube, and perhaps of the laryngeal muscles also.

Symptoms.—The symptoms to which the impaction of a foreign body in the œsophagus gives rise, will vary very much according to its bulk, form, consistence, &c. If the body be long and pointed, and if its axis be not parallel to that of the tube in its descent, its pointed extremity is very likely to pierce the walls of the tube as it is impelled onwards by the contractions of the muscular fibres behind it. If, on the other hand, it is merely large and rough, it glides along unopposed till it becomes embraced by the circular fibres of the œsophagus, which contract upon it to force it onward. "Its asperities then irritate the mucous membrane, and this irritation gives rise to a spasmodic contraction of the muscular fibres, which grasp the foreign body so powerfully that a 'bourrelet' is formed above and below it, which effectually prevents both its ascent and return, in spite of the most violent efforts of deglutition and of vomiting." (Begin, Mem. sur les Corps etrang., in Recueil de Med. Militaire, xx., 337.)

The symptoms of the arrest of a foreign body in the gullet

may be divided into the primary (immediate) and the secondary (remote). Those of the former class are mostly due to spasm, to which the irritation caused by the presence of the impacted substance gives rise. When the body is of an angular or pointed form it sometimes gives rise to a considerable amount of pain, but this is seldom very marked, and is principally felt when the seat of impaction is at the upper extremity of the tube. On the other hand, if the body be very large, it may give rise to very serious symptoms, due to the mechanical effects of its presence. It may occlude the upper opening of the larynx, and in this way cause speedy death by asphyxia; or, it may effectually compress the air-tube lower down with a like result. Such cases are, however, very rare, and are only likely to be met with among lunatics. It is sometimes seen also, as Nelaton observes, in the Hospitaux des Vieillards: "Dans ces établissemens, la nourriture est quelquefois peu soignée, on donne à des vieillards dépourvus de dents de la viande fort dure qu'ils ne peuvent mâcher, et qui s'arrête dans le pharynx, au niveau de l'orifice supérieure du larynx, dont ils déterminent l'occlusion. Cet accident est plus a redouter encore sur des sujets qui, par suite d'affection cérébrale anterieure, ont une paralysie incomplète des organs de la mastication et de la deglutition."

When a foreign body is arrested in the œsophagus the patient immediately experiences a sensation of pain more or less acute, according to the situation and nature of the body, also according to the nervous constitution of the patient; but seldom, as we have already observed, is this pain very severe. A sense of distress and of impending suffocation is also felt, and it is to be observed, that these are always referred to the upper extremity of the tube, whatever may be the point at which the foreign body has been arrested. Violent and even convulsive efforts are soon made to reject it; respiration becomes impeded, the face reddens and swells, and soon becomes cyanotic, the eyes fill with tears, and the patient appears in a state of violent agitation, principally due to the terror caused by the threatened apnœa. The spasm is now so violent that deglutition is impossible. When the foreign body is small,

and angular or pointed, the symptoms may be limited to some local pain, with a pricking sensation in the part, but the irritation of its presence gives rise to a spasmodic contraction of the muscular fibres of the tube, which often effectually resists all efforts to dislodge it. In a case of this kind, met with by Dupuy,[1] he attempted to introduce his finger into the œsophagus for the purpose of dislodging the foreign body. The finger was so tightly grasped by the upper end of the tube, that he not only failed to effect his object, but even found considerable difficulty in withdrawing it. He then bled his patient to syncope, when the foreign body was removed without further difficulty.

After some time the spasm subsides—and with it the agitation to which it gave rise—whether the foreign body be dislodged, or remain still impacted in the tube. In the former case it may either return to the mouth or descend into the stomach. These early symptoms are always more aggravated in proportion to the height of the level at which the foreign body has been arrested. When it is towards the lower extremity of the tube there may be only slight uneasiness perceived at the time, followed by difficulty or impossibility of deglutition: if the impaction be not complete, the slow descent of the body will be accompanied by a sense of dilatation or tearing along the course of the œsophagus. This sensation is felt more acutely as it passes through the cardiac opening, after which it instantly ceases.

But the symptoms which are most to be dreaded of those which arise immediately after the impaction of a foreign body in the gullet, are those of asphyxia, which may be due in some cases, as we have already seen, to mechanical occlusion of the air-tube; in others, as we will now proceed to consider, to spasmodic closure of the glottis. This result is only to be met with when bodies of a certain bulk and of irritating nature become arrested high up in the tube. When spasm of the glottis sets in from the reflex irritation of the vagus nerve,

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[1] Acad. de Chirurg., vol. i.

death is usually instantaneous. Le Dran[1] has recorded a case of this kind, in which a man swallowed at table a large morsel of "shoulder of mutton" which was arrested in the œsophagus. He retired from table to try to get rid of it. As he was not seen returning within a reasonable time, some one went to search for him and found him leaning against a wall, quite dead. Cases of sudden death from the same cause have also been recorded by Ambrose Pare, F. Hildanus, and many others. A case exactly similar to the above was seen by Mr. Wakley.[2]

General convulsions sometimes occur on the impaction of a foreign body in the œsophagus. F. Hildanus[3] relates a case occurring in a young man who had swallowed a small bone. The convulsions immediately ceased when it was forced downwards into the stomach. Godinet[4] saw a young girl in whose gullet a fish-bone had been impacted; acute pain, followed by violent general convulsions, was the result. They tried to get her to drink some water from a glass which they managed to insinuate between her teeth; but at this moment a violent spasmodic closure of the jaws took place, by which the portion of the glass between the teeth was broken into fragments, several of which were swallowed, and increased the already existing mischief. Four days after both the pieces of glass and the fish-bone were rejected by vomiting, after which the patient did well. Larrey mentions the case of a soldier in whom tetanic spasms arose after the arrest of a fish-bone in the œsophagus. The symptoms yielded to treatment, and the bone was afterwards discharged by suppuration.

When the foreign body is of a sharp or pointed form, it may at once perforate the walls of the œsophagus, and, by wounding some of the vital structures in the neighbourhood, give rise to a rapidly fatal result. Everybody knows the story of the juggler who was attempting to perform his wonted feat

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[1] Nouv. Bibl. Med., iii., 125.

[2] *Vide* Lect. by Mr. Hamilton, Dub. Hosp. Gazette, March, 1856.

[3] Cent. i., Obs. 36.

[4] Annales de Montpellier, iii., 230.

of swallowing a sword, and, on finding the act of deglutition unusually difficult, used some force to send it onwards, which act forced the point of the instrument into the pericardium, an accident that soon caused the unfortunate man's death. But this was not simply an impacted foreign body, so that we will not dwell further on the case. A large bloodvessel also may be perforated, and the accident followed rapidly by death from hæmorrhage. The most interesting case of this kind perhaps on record, is that of Dr. Kirby. (Dublin Hosp. Reports, vol. ii.) :—

"One evening in December, 1815, I was called to visit a poor woman who was brought to St. Peter's and St. Bridget's Hospital by some humane persons, who found her in the street in an almost lifeless condition. She was one of those miserable creatures who feed in our streets upon the mixed offal which they receive from servants. She was greedily enjoying this wretched fare when a morsel stuck in the œsophagus. When I arrived at the hospital she was dead to all appearance, yet I opened the trachea above the sternum, and patiently inflated the lungs for a considerable length of time, but to no purpose. At the sides of the neck there prevailed a remarkable fulness, which I could not explain until the parts were afterwards examined. . . . Three large morsels of food (GHI, Plate IX.) were found in the œsophagus: the superior, which seemed the largest, lay immediately behind the cricoid cartilage; the inferior occupied the œsophagus nearly as low down as the upper extremity of the sternum. This morsel contained a piece of bone (K) an inch and a-half long, one of its ends being very sharp and pointed. The bone lay obliquely across, transfixing the œsophagus at its left and posterior part, and wounding the right subclavian artery (L), which, contrary to its usual course and origin, lay in this situation as it passed from the left of the arch of the aorta, where it arose, towards the right shoulder. The surrounding cellular membrane was filled with blood (NNN), which, accumulating principally at the sides of the neck, had produced the fulness of the surface, a circumstance until now inexplicable. The œsophagus and trachea were both free from blood. The latter was pervious, and did not seem diminished by the pressure of the morsels. The epiglottis (D) almost completely concealed the cavity of the glottis (F), which was so diminished by the forward inclination of the arytenoid cartilages (EE), as to be scarcely discernible. The rima glottidis was altogether closed."

In his remarks on this case the author observes :—

"This case adds to the list of those which attract us rather by their

singularity than by the usefulness of any hints they furnish to the practical surgeon. It seems, however, to confirm the opinion, that it is not to the mechanical obstructions of the trachea we are to look for the immediate cause of death, when a solid substance is arrested in its descent through the upper part of the œsophagus, so much as to the spasmodic constriction of the muscles of the glottis."

Neither the wound of the artery, nor the consequent effusion of blood, appeared to have contributed.

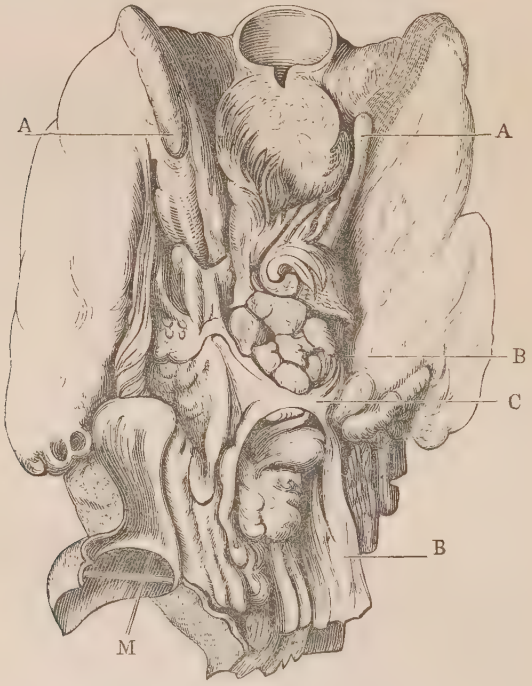

PLATE IX.—AA, Pharynx slit open posteriorly: BB, œsophagus slit open posteriorly: C, a small tranverse portion of do.: M, a bristle introduced into the wound of the artery.

The secondary effects of the arrest of a foreign body in the œsophagus make up a much longer list than those which we have been considering. Of these, the first in point of time, and that which we shall first consider, is—

INFLAMMATION.—When a foreign body has been arrested

for any length of time in the œsophagus, this is necessarily the result of the irritation caused by its presence. If the body become dislodged sufficiently early, this inflammation may terminate by resolution; if, on the other hand, the body remain in situ for a considerable time, the inflammation may go on to any of the other terminations of œsophagitis (acute or chronic, as the case may be) which we have already considered. The first in order of these is—

Suppuration.—This is the usual result of inflammation caused by the presence of a foreign body. The effect of the suppuration which takes place around the latter is, generally, to set it free, owing to the destruction of tissues immediately in contact with it, and also to the subsidence of the inflammatory swelling which had succeeded to the stage of spasm, and had still further contributed to the detention of the irritating substance.

Gastellier[1] has recorded the case of a young man who swallowed a six-franc piece, which became arrested about the middle of the œsophagus. For six months it remained there, during which time the patient was tormented with the most acute pains, with convulsions, and with continual vomitings, sometimes of food, sometimes of mucus mixed with pus and blood. At the end of that period, when the patient was reduced to the last degree of emaciation, a violent attack of convulsions on one day was followed by syncope, which his attendants feared was about to prove fatal. Immediately after recovering from the attack the six-franc piece suddenly descended into the stomach.

A very interesting case—both with regard to the enormous length of time during which the foreign body remained in the œsophagus, and also in the error of diagnosis to which the symptoms gave rise—has been recorded by Gaulthier de Claubry.[2] A young girl, in partaking of some soup, had swallowed a fragment of bone. It gave rise to severe symp-

[1] Recueil Periodique, xxiii., 147.

[2] Recueil Periodique, xxxiv., 13 (quoted by Mondiere).

toms at the time, but, as they ceased entirely after a short period, it was thought to have descended into the stomach. For some time there was no symptom present, except a slight "sentiment douloureux" in swallowing. After the lapse of some time, however, it was observed that the girl became emaciated, her voice was reduced to a whisper, and there was great hoarseness, while the patient began to be tormented with a harassing cough, which increased very much within a short period. Fever was now lighted up; pains in the chest were complained of; the sputa became thick, grayish, and blood-stained, and her medical attendants believed her to be in the second stage of phthisis, and treated her accordingly. *Fourteen years* passed in this way, at the end of which time G. de Claubry was consulted. At first sight he thought that she was in the last stage of phthisis; but a more careful examination, together with the history of the case, led him to change his opinion. On examining the mouth, he found the fauces covered with pus and blood. On washing these parts he found that they were inflamed, and he noticed that the inflammation increased towards the pharynx. On making gentle pressure along the neck, he found that the patient winced and complained of pain when he pressed that part of the neck immediately above the left clavicle. He then determined to employ an emetic, but, as he prepared to commence his treatment, Nature lent her aid, the patient felt an inclination to vomit, and in the course of the act, after having felt a pain in the neck, as if some one were tearing it, she rejected the bone which, during a period of fourteen years, had caused her so much suffering. This patient did well afterwards.

In the *Lancet* of 1829, vol. ii., is recorded the case of a boy of eleven, who swallowed an ear of rye. A violent continued cough, with attacks of threatened suffocation, were the immediate result. These soon went off, and symptoms of phthisis appeared, which went on increasing for more than a year, at the end of which time the ear of rye was brought up during a violent fit of coughing. From this time the symptoms of phthisis rapidly declined, and the boy recovered completely.

Abscess.—Instead of the pus readily finding its way by the side of the foreign body into the canal of the œsophagus, and being discharged as fast as it is formed, it sometimes collects and forms an abscess, which may be situated in the walls of the tube, or may extend into the surrounding areolar tissue. Abscesses of the former class usually burst during the act of vomiting, or even during a fit of coughing, and leave the foreign body free to ascend or descend: they are sometimes burst by the passage of an instrument, as we have already seen to happen in case of idiopathic abscess. Abscesses of the second variety run a riotous course in the loose cellular tissue; they extend in various directions, and generally lead to a fatal termination: they sometimes open on the side of the neck, or in some more distant part of the surface, and allow the escape of the foreign body externally. The following is an example of this mode of termination:—

An infant, one year old, accidentally swallowed an ear of rye. An attack of convulsions immediately followed. These gradually disappeared. Emetics were administered with the hope of dislodging the foreign body, but without success. Continued cough followed, accompanied by cold sweats. On the tenth day an abscess pointed between the third and fourth false ribs, from which, when opened, the ear of rye protruded and was extracted, after which all the symptoms disappeared. The abscess had probably made its way along the posterior mediastinum, and then through the intercostal muscles.[1]

Mondiere[2] gives after Hoffer the particulars of a fatal case which, if serious at its termination, was certainly somewhat comical in its origin. The story is of a drunkard who had been in the habit—after filling and emptying his glass as often as he thought proper—of breaking it into small pieces and swallowing the fragments. This feat he had often performed with impunity, but on the last occasion it cost him his life. Soon after the performance an acute pain was felt opposite the left sterno-clavicular articulation, which was increased by each act of deglutition; also a "sentiment de feu" in the

[1] Lancet, 1829, vol. ii.
[2] Arch. Gen. de Med., t. xxiv.

whole of the left side of the chest. These pains were accompanied by great precordial anxiety, and a quick, small, and intermitting pulse. He soon succumbed, and after death an opening of more than an inch in length was found in the œsophagus, at the level of the sterno-clavicular articulation, and which communicated with the cavity of the thorax.

Perforation.—We have already seen that perforation of the walls of the œsophagus, and fatal injury to some of the important parts in the neighbourhood, may be the immediate result of the deglutition of a pointed body. But this accident is much more frequent as the result of a process of ulceration, by which the foreign body makes its way through the surrounding tissues, and opens into a large bloodvessel, or into the pleura, pericardium, or even into the heart itself. Martin[1] relates the particulars of such a case. A soldier, who was engaged in amusing himself before his comrades, was suddenly seized with vomiting of blood, which continued in spite of all the means adopted to control it, and soon led to a fatal issue. On examination of the body, a six-franc piece was found in the œsophagus, at the level of the bifurcation of the trachea. It was firmly grasped by the walls of the tube, and at one point had formed an ulcer, which perforated the aorta, and in this way had led to the fatal hæmorrhage. Several cases of a similar kind are quoted by Mondiere from various writers. One is that of a carabineer who swallowed a piece of bone, which laid open the demi-azygos vein (Saucerotte). A second case proved fatal from perforation of the common carotid artery (Dumonstier). The third and fourth are also instances of perforation of the aorta, one by a coin, the other by a piece of bone (Lamenain, Dubreuil). In another case the vena cava (which?) was believed to have been the vessel engaged (Lovadina). A more remarkable case than any of those we have hitherto mentioned is the following:—

"A woman, by occupation a hawker, was brought into University College Hospital by some one who had found her sitting on a door-

[1] Jour. Univ., t. xlvi.

step suffering from severe pain in the chest, accompanied by a feeling of faintness, which had compelled her to sit down. When brought into the hospital life was extinct, but the body was still warm. There was no satisfactory history to be obtained of her sudden illness.

"On *post-mortem* examination, a fish-bone was found perforating the stomach, close to the cardiac end of the œsophagus; then the diaphragm, and pericardium, and the substance of the posterior surface of the heart, there inflicting a jagged wound in the middle of its septum, immediately over the right coronary artery and vein, and penetrating the latter. The cavities of the heart were not invaded, but the pericardium was filled with a pint and a-half of fluid blood from the wounded vein, in which filaments of fibrin were arranged in a net-like form. The jagged appearance and large size of the wound in the heart, when compared with the sharp end of the bone, must have been produced slowly, by being rubbed against the projecting point by the action of the heart.

"Death appeared to have taken place by a process of slow syncope, as appeared from the large quantity of blood extravasated, the absence of a large clot, and the consolidation of the fibrin in the form of threads. The heart had acted as a churning apparatus, and had whipped the blood, so to speak, of its fibrin, with the aid of the projecting piece of bone.

"The bone was probably first lodged in the lower end of the œsophagus, with its sharp end in contact with the mucous surface of the stomach, in the folds of which it became entangled. When the blunt end, which lay in the gullet, was pressed upon by the mass of food, aided by the peristaltic action of the tube, the pointed extremity was forced into the coats of the stomach. At the same time that the mass descended into the stomach, it would tend to cause the bone to make a revolution, so that the point would be directed upwards, and very probably the whole transfixion had taken place at the same moment."

A case has been recorded in the "Charleston Medical Journal and Review"[1] of a man who swallowed two of his false teeth with the gold plate to which they were attached. The foreign body gave rise to some pain and uneasiness at first, which gradually increased in severity. On admission into hospital he complained of severe pain in the epigastrium, extending around the left side of the spinal column, accompanied by nausea, a complete disgust for food, and an entire loss of sleep. . . . He died on the fourteenth day after the acci-

[1] Dub. Med. Press, vol. xxxix.

dent. Some hours before death he became delirious, the face was livid, and a cold sweat appeared over the surface of the body. On examining the body, the pericardium was found to be greatly thickened and inflamed. It was distended by fœtid gases, and contained several ounces of a sero-purulent fluid, of a dark-greenish colour. The foreign body was found in the œsophagus two and a-half inches above its cardiac end: it had ulcerated through right and posterior aspect of the pericardium.

The perforation may be into the trachea, or lung. A case in which perforation of the trachea was the result, and led to a fatal termination, was related by Mr. Hamilton.[1]

Gangrene.—In some rare cases the foreign body gives rise to gangrenous inflammation of the walls of the tube and of the surrounding cellular tissue, with a necessarily fatal result. An example of this termination was brought under the notice of the Pathological Society by Dr. Lyons, on the 13th of January, 1866:—

The man who was the subject of it, while breakfasting on bread and fried liver had, as he stated, bolted a piece of crust of the dimensions of his forefinger, with a portion of liver along with it. This stuck in his throat, and he made violent efforts to dislodge it, by passing his finger as far as he could into his throat, and by making repeated regurgitating efforts. This he believed he had succeeded in doing, and for the remainder of the day he had suffered little or no inconvenience, nor did he suffer any inconvenience on the two following days. On the fourth day (Wednesday) he was admitted into Jervis-street Hospital, "complaining of a certain amount of uneasiness in the throat. There was a great deal of swelling below the angle of the jaw on the right side, with some tenderness." Nothing was detected in the throat by either the eye or the finger. Under treatment the symptoms were greatly relieved, and the swelling went down considerably. On the following Tuesday, when gargling his throat, he brought up a quart of foul, fœtid, grumous matter, partly mixed with blood. . . . . On Thursday morning he was suddenly seized with an attack of weakness, and threw up a quantity of grumous stuff." Dr. Lyons was sent for, but just as he arrived the man expired.

[1] "*Lecture*," Dub. Hosp. Gazette.

On post-mortem examination, when the tongue and all the back parts to the spine were removed, "there was found upon the spine evidence of the most extensive gangrenous destruction of all the tissues about the œsophagus, extending from the lower part of the larynx, down a long way into the posterior mediastinum, and near to the cardiac orifice of the stomach. He now proceeded to slit open the œsophagus, and found, on doing so, the obstruction in the shape of a fine piece of bone, lying right across the tube. It was from an inch and three-quarters to two inches below the level of the rima glottidis, and it was impossible to touch it with the finger, so that no physical evidence of its presence could be ascertained by digital or ocular examination. It appeared to him to be a sharp piece of bone such as would be detached from a rib of bacon." The man had never spoken of swallowing any bony substance, and had attributed the pain and uneasiness in his throat "to the violent regurgitating efforts and the violent manipulation which he had used to get rid of the piece of bread and liver which constituted, in his own opinion, the obstruction in the first instance."

Another case of impacted bone leading to a similar termination was exhibited to the Society by Dr. Hayden, January 25, 1868 :—

A man, aged sixty-six, presented himself at the Mater Misericordiæ Hospital, declaring that he felt an obstruction beneath the sternum in attempting to swallow either solids or liquids. This difficulty, but in a less aggravated form, had existed for the previous six months. . . . There was no evidence of any organic disease. On the night of his admission his neck became suddenly swollen, and his breathing greatly embarrassed. On the following morning Dr. Hayden found his neck greatly swollen, especially at the root : it was somewhat red and tender, especially on the left side, but there was no inflammation of the fauces. There was loud stridulous breathing, with a remarkable gurgling in the throat. All over the chest there were loud bronchitic râles, and over the ensiform cartilage a rough jerking murmur was heard with the first sound : this did not exist in the heart. On attempting to swallow, the man complained of great pain at a point corresponding to the lower part of the sternum. He declared that he could not make the liquids enter his stomach ; that, to use his own language, 'they were stopped there,' placing his hand over the sternum. . . . There was no history of swallowing or of feeling any foreign body in the throat. . . . . On the second day after admission the man died of syncope.

On *post-mortem* examination the parts were found to present the appearance of diffuse inflammation of the neck. "The glottis was

remarkably œdematous ; the epiglottis was very much swollen, but not red, and the tissues all around were likewise in this state. The walls of the pharynx were thickened and dense, and the areolar tissue connecting the pharynx and œsophagus with the vertebral column was extensively infiltrated, and in a dark sloughy condition, the result of gangrenous inflammation. About four inches below the larynx, two sharp fragments of bone, about an inch in length, were found impacted in the œsophagus, placed at right angles to the axis of the tube. They lay side by side, held in juxta-position by a piece of membrane, and transfixing the œsophagus at both their extremities. The punctures made by the ends of these spiculæ communicated with the periœsophageal abscess occupying the left side, and containing a considerable quantity of yellow creamy pus. He was unable to trace any connection between this abscess and the seat of diffuse inflammation in the neck, but, manifestly, while the abscess had not become diffused, the inflammation resulting from it had, and was the immediate cause of death." . . . Dr. Hayden observed that this case was interesting in a diagnostic point of view. "The question arose, considering the murmur at the ensiform cartilage, whether it might might not be a case of abdominal aneurism. He dismissed that idea, firstly, because of the absence of abdominal pulsation, and of pain, save on attempting to swallow, and secondly, in consequence of the occurrence of diffuse inflammation : this could not have been the result of extravasation of blood from an aneurism competent to produce œsophageal obstruction, because in such a case death would have immediately followed."

Caries of the Vertebræ.—A single case of spinal caries, supposed to owe its origin to the presence of a foreign body in the œsophagus, is quoted by Mondiere from the Journal General, vol. xiii. It is the only one which he was able to find recorded. The case was one of a child, æt. twenty-two months, who had swallowed a small flat bone, of a triangular form. Two months after, it died, having been reduced to an extreme state of emaciation, and there was found a perforation in the posterior wall of the pharynx, at the level of the third cervical vertebra. A probe introduced through the opening, passed into a cavity formed of the second, third, and fourth cervical vertebræ, which were carious. The spinal cord was intact, but its membranes had undergone some alterations. A similar case has been since recorded by Nelaton (Elemens de Pathol. Chirurg., iii., 356).

Dilatation.—Ludlow's hypothesis—that dilatation of the œsophagus was in his case the result of impaction of a foreign body in the tube—has been already mentioned, together with the objections to which it is open.

Contraction.—Contraction of the calibre of the tube has been mentioned by some writers as one of the remote consequences of the arrest of a foreign body in the œsophagus. It is due, of course, to cicatrisation of an ulcerated surface.

Scirrhus.—Mondiere has given "Scirrhus" of the walls of the tube as one of the changes which may be brought about by the lodgment of a foreign body in the œsophageal canal, and he cites two cases as examples. In this he has been followed by Velpeau,[1] who, indeed, has faithfully followed everything that he said on this subject. Nelaton[2] objects, "Mais il est plus que probable que dans ces circonstances le rétrécissement et la dégénérescence des parois de l'œsophage se sont montrés d'abord, et ont forcé le corps étranger à s'arrêter dans un point de la continuité du canal œsophagien."

Diagnosis.—If seen at once there can be no difficulty in the diagnosis. But at a later period there are certain points which it will be well to remember in these cases. (*a*) A patient may deceive both himself and the surgeon as to the presence of a foreign body. (*b*) The presence of a foreign body has given rise to symptoms simulating pulmonary phthisis, and other thoracic affections.

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[1] Dict. de Med., Art. Œsophage.

[2] Elem. de Pathol. Chirurg., iii., 401.

CHAPTER XII.

INJURIES TO THE ŒSOPHAGUS FROM THE DEGLUTITION OF STRONG ACIDS, OR CAUSTIC ALKALINE SOLUTIONS.

"The effect of corrosive liquids on the œsophagus is to produce in the lowest degree separation of the cuticle, in a higher degree effusion of lymph, in the highest sloughing of the lining membrane to a greater or less extent; which, being thrown off, leaves a granulating surface that, cicatrising, contracts and narrows the canal, establishing permanent and fatal stricture." This pithy sentence of Mayo's gives, in the fewest possible words, a bird's-eye view of the pathological changes which take place in the œsophagus as the result of the deglutition of corrosive fluids, and may be taken as a suitable "text" for a more minute disquisition.

The action of irritating liquids on the mucous membrane of the œsophagus may be divided into (1) that which is immediate or primary, and (2) that which is remote or secondary. Their effect generally extends over the inside of the mouth, the fauces, the œsophagus, and stomach, and sometimes even beyond the latter; sometimes, when the quantity swallowed is small, it is limited to the mouth and œsophagus, so that there is scarcely a trace visible in the stomach. It is influenced by the strength of the liquid as well as by its quantity; also by the period of time during which the destructive agent was in contact with the parts. When a pretty large dose has been swallowed, the amount of injury to the mouth and fauces is less than that found in the other parts, in the œsophagus it is more marked, while it reaches its greatest height in the stomach.

The destructive effects of these agents have been divided by Rokitansky into a number of different degrees:—

(1) "In the lowest degree the effect is limited to destruction of the epithelium. The mucus of the mouth and the fauces contains flocculent coagula; the epithelium is converted into a thick, greyish-white, rugose layer; it peels off here and there, and the subjacent mucous membrane is pale."

(2) "In an advanced degree the superficial layers of the mucous membrane of the fauces and œsophagus, under the destroyed epithelium, are found corrugated, of a dirty, whitish, leaden hue, and the capillary network blackened by its carbonified contents. The lower strata of the mucous membrane, and the submucous cellular tissue, present serous infiltration. In the follicles at the root of the tongue, the mucous secretion is coagulated into dirty white masses."

(3) "In a still higher degree, the entire mucous membrane is destroyed, and converted into a dirty gray mass, which is traversed by black vessels; the submucous cellular tissue is infiltrated, and partially ecchymosed; the muscular coat of the œsophagus itself is shrivelled, pale, ashy."

(4) "In the highest degree, the mucous membrane of the œsophagus, together with the submucous cellular tissue, is converted into a soft, black mass, which is distended by a sanguinolent fluid, and is easily detached from the muscular coat. The latter is itself either destroyed in the same manner, or is perfectly colourless, friable, and presents an ashy, gelatinous appearance."

In many cases where the destruction has been of the highest degree, the blood, not only of the neighbouring capillaries and small vessels, but also that of the large trunks, and even of the aorta, is changed into "pultaceous, pitchy, greasy, black cylinders."

When the destructive process has reached either of the two degrees last described, a rapidly fatal termination of the case must necessarily follow. The lower degrees are usually followed by recovery: reaction takes place; violent inflammation is set up in the subjacent parts, with exudation of vast quantities of lymph; the mortified epithelium sloughs,

and the surface heals by the formation of a cicatricial tissue. The changes which take place in this "new formation" are the cause of the "secondary" effects, which will be considered later on.

Symptoms.—When an acid fluid is swallowed, the patient immediately suffers from a violent burning pain, which, commencing in the mouth, passes rapidly into the fauces, pharynx, and along the whole course of the œsophagus, unto the stomach. Retching and vomiting come on almost at once, and continue incessantly, or are easily re-excited by any attempts to swallow. Whatever is swallowed is immediately ejected. The vomited matter is usually more or less viscid, and of a dark coffee-ground colour, due to the presence of altered blood. There is generally great difficulty in speaking and swallowing, and sometimes in breathing, from swelling of the mucous membrane of the fauces and larynx. The countenance becomes more or less livid, the skin cold and clammy, and the pulse quick, small, and feeble, or almost imperceptible. The patient is usually tormented with thirst; the bowels are constipated, and if any evacuations take place, they are commonly either of a dark brown or leaden colour, but in some cases almost black, from an admixture of altered blood. There is great mental anxiety and distress; but the intellectual faculties as a rule remain clear. Exhaustion advances speedily; and death often occurs very suddenly, even when the symptoms have not been very severe.

If the patient do not succumb to the immediate effects of the injury, it is often remarkable how rapidly reaction sets in, and is followed by convalescence. The injured mucous membrane of the mouth and fauces soon recover themselves; the vomiting subsides; the difficulty and pain of speaking and of swallowing gradually disappear, and in a few days the patient is on the road to recovery.

The symptoms will be found to vary a good deal in different instances. Thus, in a case of poisoning by sulphuric acid, reported by Dr. Geoghegan, the patient vomited incessantly for three or four hours. The vomiting then ceased,

and did not return, although the woman did not die until thirty-four hours after the poison had been swallowed.[1] The pain present in these cases is also a very deceptive symptom; if the mucous membrane of the stomach be the part chiefly affected, there may be almost entire freedom from pain, and, also, in those cases where sensibility has been destroyed by a very large dose of the poison, it is likely to be much less complained of than when the quantity has been smaller. The patient in the former case often dies quite unexpectedly from syncope or asthenia.

The following case reported by Dr. Wilks[2] is a good example of the primary effects of poisons of this class :—

W.V., aged fifty-six. The patient's mind was not perfectly sound, and therefore the account he gave of himself was received with much doubt. When he was admitted on the evening of October 28th, 1856, he walked upstairs to his bed, and did not appear very ill, although he was dejected, and did not speak much. He stated that he had been to a friend's house, and there, by mistake, drank about a dessert spoonful of oil of vitriol. His mouth was of a brown colour, but not excoriated. Magnesia and milk were given him. On the following day, and also on the third, he appeared depressed; but he was not otherwise ill, and it was thought, from the mildness of the symptoms, that he would recover. On the fourth day, however, he *died rather suddenly, or, at least, unexpectedly.*

Post-mortem examination.—The body was that of a strong muscular man. A yellow fluid, of acid reaction, ran from the mouth. The brain was not quite healthy. The mucous membrane of the mouth was of a yellow colour; but when this yellow epithelial layer was removed, the mucous membrane left was healthy. The front part of the tongue was also discoloured, but not the back. The œsophagus throughout was of a yellow colour. The mucous membrane was only affected in the most prominent ridges, but the walls af the organ were swollen to three times their natural thickness. This was due to a sero-albuminous exudation into the sub-mucous tissue. The top of the larynx was also slightly swollen in the same manner. The stomach appeared natural externally, and was of usual size. Upon opening it, it was found to contain about a pint of a bright yellow fluid. The mucous membrane was especially affected at the pyloric half of the

[1] Med Gaz., xlviii., 328.

[2] Guy's Hosp. Rep., 1859.

stomach. The fundus in which the fluid was found lying as usual, had only a yellow tint like the œsophagus, and the mucous membrane was softened ; but towards the middle of the stomach, the whole of the pyloric half of the interior was of a black colour, and raised up in projecting masses or ridges, which were in a sloughing condition, and would soon have been cast off. This black matter consisted of carbonised and decomposed mucous membrane, with blood within it. The whole coats of the stomach were soft, and readily tore. The charring of the stomach ended at the pylorus, but about two inches of the duodenum were of a purplish colour, and the rugæ were blackened ; below this, the intestines, both small and large, were unaffected.

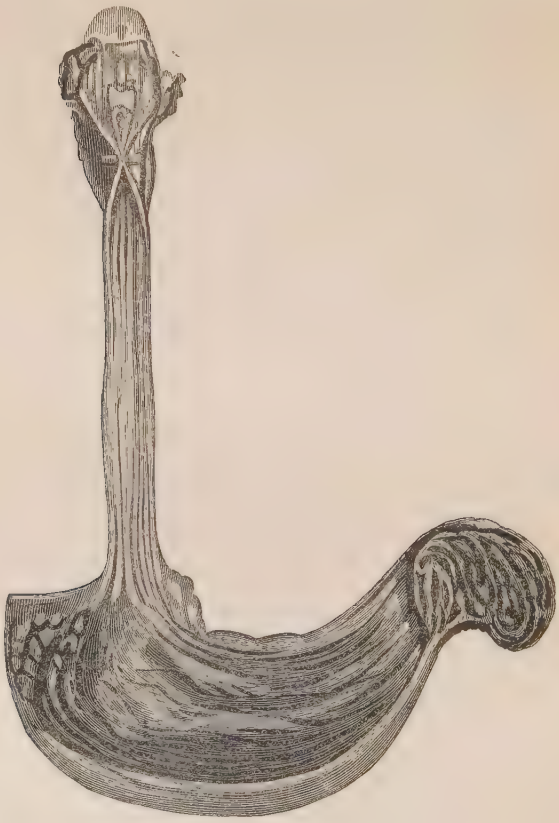

PLATE X.—The œsophagus, stomach, and a small portion of the duodenum, are laid open from behind.

Plate X. represents the appearances presented by the lining membrane of the gullet, stomach, and a small portion of the duodenum of a young man, æt. eighteen, who died in the ———— Hospital, about twenty-four hours after swallowing an ounce of sulphuric acid. Three hours after taking the poison he was brought into the hospital in a state of collapse, and suffering from the ordinary symptoms which follow a large dose of the corrosive fluid. He vomited a large quantity of grumous blood, mixed with shreds of mucous membrane; he also voided a great deal of altered blood from the bowels. He did not seem to suffer much pain; the prostration was so great, that he did not appear to be capable of feeling much. The expression of the countenance, however, was that of extreme anxiety, and the eyes, though dull, showed that he fully appreciated his dreadful position.

The mucous membrane of the œsophagus was found on

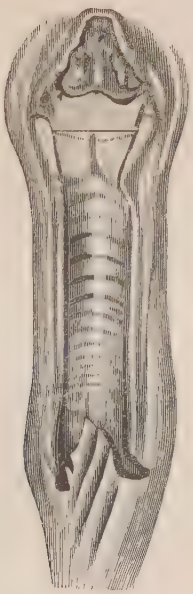

Plate XI.—The larynx and trachea have been laid open from behind to show the interior.

examination to be of a brownish colour between the rugæ, but along the summits of the latter it was completely carbonised and blackened, especially towards the two extremities of the tube. The mucous membrane of the stomach was similarly affected, especially at the cardiac end, and the first portion of the duodenum was still more corroded than either of the latter organs.

Plate II. shows the condition of the larynx of the same patient into which some of the acid had found its way. The mucous membrane of the larynx and trachea is seen to be a good deal corroded, while the epiglottis is intensely red and inflamed. There is not, however, a great deal of tumefaction. (Dyspnœa had not been urgent, but there was a good deal of cough during the time that the patient survived.)

When the irritant poison is one of the caustic alkaline solutions, the symptoms are similar in their principal features to those produced by one of the strong acids. The former differ in their taste, of course, which is caustic and alkaline in this case. In one remarkable case[1] of poisoning by soap-lees there was great heat of skin observed, although the contrary is the general rule.

But even when the primary effects of the corrosive poisons are recovered from, the secondary consequences are still to be dreaded. The dead tissues having been cast off by the inflammatory process which is set up beneath, the breaches in the continuity of the tissues which form the wall of the œsophagus are filled in with a cicatricial tissue, which by its contraction forms a stricture, valvular or zonular, as the case may be. "If the mortification be limited by the submucous cellular tissue, we shall find the latter condensed over the pale, ashy, muscular coat, which now resembles the elastic tissue, into a serous, or fibro-serous, tissue, replacing the mucous membrane to a considerable extent. . . . If the muscular coat itself is involved, it is partially or entirely destroyed, and the walls of the œsophagus are converted into

[1] Guy's Hosp. Reports, 3rd ser., v., 133.

a fibro-cellular firm tissue, which contracts, and thus produces the most important and the most resisting strictures." The stricture so formed goes on contracting, slowly but surely; "difficulty of deglutition results; increased obstruction perpetuates the inflammatory condition, surrounding

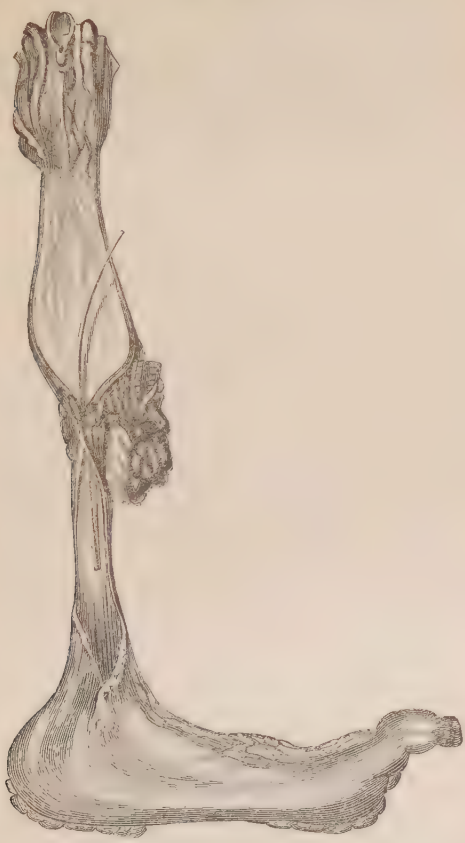

PLATE XII. shows the appearances presented by the interior of the œsophagus of a patient who died of exhaustion, caused by stricture of the gullet, two and a-half years after swallowing, by mistake, a small quantity of sulphuric acid.

textures become thickened; the stricture continues to increase, and finally becomes impassable, and the miserable patient at

last dies, less from the morbid process itself, than by want of nourishment, or craving hunger and insatiable thirst continued unrelieved, and these, mocked by the ineffectual efforts for their relief, consign the poor sufferer to incoherency and delirium, and death ensues. And thus the fabled torments of the Lydian king for his filicidal impiety become virtually realised in the sufferings of modern humanity :—

> 'Nec bibit inter aquas, nec poma patentia carpit
> Tantalus infelix! quem sua fata premunt.'"[1]

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[1] Basham. Med. Chir. Trans., xxxiii., 104.

CHAPTER XIII.

WOUNDS OF THE ŒSOPHAGUS.

Wounds of this organ, as of other parts of the body, may be divided into contused, incised, punctured, lacerated, and gunshot.

The dangers of a contused wound of the œsophagus are those which result as a consequence of the inflammatory swelling of the affected portion of the tube, and of the tissues around; the superficial part of which must be, of course, severely bruised before a contusion can be conveyed to the walls of the tube itself. This swelling may be so great as seriously to interfere with deglutition, and sometimes even with respiration. At a later period abscess may form, which may give rise to signs of pressure on the trachea, or œsophagus, or both.

It may also, of course, give rise to any of the various other symptoms which we have already mentioned as attending or following abscesses in this situation.

The other classes of wounds may be considered under the same heading. They may be divided into two great classes :—

(I.) Those in which the injury is inflicted on the walls of the œsophagus from within its canal:

(II.) Those which penetrate from without.

This division is of great practical importance, as wounds of the first class may be confined, at least in the first instance, to the walls of the tube itself; while, on the other hand, a penetrating body can hardly reach from the surface inwards without some serious complication, as is evident when we consider the great depth at which the tube lies, and the number of important structures which surround it. A wound

of this variety may involve any portion of the whole length of the canal from its pharyngeal to its gastric extremity, and, accordingly, injuries of this class may be conveniently arranged under two heads according as they engage (1) the cervical, or (2) the thoracic portion of the œsophagus. The latter are, of course, as a rule, much more serious than the former, from the still greater depth at which the tube lies in the thorax, and the almost complete impossibility of reaching it from the surface, without gravely damaging one or more of the vital structures to which it is related throughout the whole of its course in this cavity.

Incised wounds of the œsophagus may also be either longitudinal or transverse, the latter involving either a portion or the whole of the circumference of the tube. This is a very important classification as to prognosis, as we shall see later on.

(I.) Wounds of this organ inflicted from within are usually slight, and are in most cases due to the deglutition of rough or pointed substances, which lacerate or perforate the walls of the tube. Lacerated wounds of this kind are generally superficial, and usually heal rapidly if the offending substance be removed in good time; punctured wounds are much more dangerous, sometimes proving fatal immediately from laying open a large vessel, at other times leading to a similar result by a slower and still more painful process, from the destructive inflammation and suppuration to which the presence of the penetrating body may give rise. The lung may be the organ engaged, and pneumonic abscess be the result; or diffuse inflammation may attack the surrounding areolar tissue, and enormous depôts of pus form around the tube in the neck, or in the posterior mediastinum. Instances of each of these various results have been given in the chapter on "Foreign Bodies." We have also seen that gangrene may result from the penetration of the walls of the œsophagus by a small piece of fish-bone, &c. Wounds of the tube by more formidable instruments are sometimes inflicted on themselves by lunatics, who sometimes amuse themselves by attempting the deglutition of such a bolus as a large knife, a fork, a rusty nail, &c.

They may also, although, of course, more rarely, happen to jugglers in the practice of their art. The well-known case of the juggler—who inflicted a fatal wound on his pericardium in the attempt to swallow a sword—has been already alluded to. Wounds of this class have also been sometimes inflicted on the gullet when the instrument has been passed through the mouth by a still less friendly hand.

Mondiere has recorded a case of an officer who, in fencing, received a thrust of a foil in the mouth. The instrument passed through the velum pendulum palati, and wounded the œsophagus about its middle. Very severe symptoms followed, the patient was threatened with suffocation, and delirium also set in. These symptoms, however, yielded to treatment, and the patient ultimately recovered. A nearly similar case has been recorded by Wilmer;[1] this ended fatally.

(II.) Incised wounds produced by instruments passing from without inwards, constitute the vast majority of those met with in this organ. They may be either longitudinal or transverse. The former are comparatively rare, and the greater number of the recorded cases have been those made by the surgeon in the operation of œsophagotomy. The terminations of wounds of this class have been favourable, the fatal results having been generally due to other complications. In the article on this subject in Holmes's "System," by Mr. Durham, all the recorded cases of œsophagotomy have been collected and tabulated. They were twenty-one in number, and of these seventeen were followed by recovery; the deaths in the four remaining cases not being due to the operation, but to previously existing complications. Guattani,[2] who made several experiments on dogs, never found any serious symptoms to follow a wound of this class. By simply approximating the edges of the wound, complete union was always established from the fifth to the eighth day.

Transverse wounds of the œsophagus are usually much more serious, as they are so much more likely to be followed by

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[1] Cases and Remarks in Surgery, p. 86.

[2] Acad. de Chirurg., iii., 351.

extravasation of the ingesta into the surrounding cellular tissue, and they were indeed believed till a comparatively recent period to be invariably fatal when engaging the whole circumference of the tube.

This popular error was also confirmed by Jobert, who performed several experiments on dogs with the view of determining the truth of the prevailing opinion. In every case in which he divided the gullet completely the result was fatal. In one case he found, on examining the parts after death, "les bouts de l'œsophage recouverts d'une membrane organisée; sur la partie postérieure de la trachée-artère et sur la face antérieure des muscles de la colonne vertébrale, il trouva une autre membrane lisse qui formait une poche dans laquelle les liquides étaient versés. Elle empêchait l'infiltration dans le tissu cellulaire et les parties environantes." Mondiere,[1] after noticing the results of the latter experiment, demands, "si cette piece pathologique ne serait pas de nature à faire espérer un résultat plus satisfaisant encore. Ne pourrait-on pas introduire dans l'œsophage une sonde, au moyen de laquelle on nourrirait le malade, et peut-être en même temps que la plaie extérieure et celle de la trachée se cicatriseraient, se formerait-il autour de la sonde une organisation du tissu cellulaire analogue à celle observée par M. Jobert?" This suggestion has often since been acted on with a successful result. Velpeau,[2] after referring to the results of the experiments of Jobert, and signifying his approval of the suggestion of Mondiere, adds—"Mais quand même ce résultat ne pourrait être obtenu, il ne faudrait pas, pour cela, vouer à la mort les personnes chez lesquelles l'œsophage serait complétement coupé en travers: il faudrait chercher à les nourrir à l'aide d'une sonde que l'on introduirait dans la portion inférieure de l'œsophage." This treatment has also been successful in preserving life, and an example has been recorded by Trioen which happened in the person of a soldier, who, in an attempt at suicide, cut his œsophagus clean across. The retracted

[1] Arch. Gen. de Med., ii.e serié, ii., 520.
[2] Dict. de Med. Art. Œsophage.

ends of the tube remained separated by a considerable interval, and during the remainder of his life, which lasted for a good many years, he had always to be fed through an œsophageal tube introduced through the fistulous opening which remained into the lower portion of the gullet.[1]

But even before Mondiere and Velpeau wrote the articles from which the above quotations have been made, cases of recovery after complete division of the œsophagus had been published. The following example may be found in the *Lancet*, 1829-30 (vol. ii.), into which it had been copied from one of the German journals :—

C. Schnorr, aged thirty-seven, of athletic constitution, was admitted into the University Hospital of Kiel, on February 27, 1827. He had attempted suicide by cutting his throat, and, although he had failed to effect his object, he had succeeded in inflicting an enormous wound of six inches in width, and which gaped to a distance of three inches in the middle line. The line of incision passed through the trachea, between the first and second rings, and the œsophagus was also completely divided. The large vessels and nerves had, fortunately, all escaped. Milk, introduced into the mouth, brought on a paroxysm of violent cough, and escaped through the external wound. . . . The wound in the trachea was united by sutures, but they failed to keep the parts in position. The head was then kept as close as possible to the chest. . . . On the 27th there was no wound in the œsophagus visible externally, and the case recovered completely.

The following remarkable case of injury to the œsophagus, although not coming under this division, may be noticed here :—

An ox in a state of fury attacked a man, and raising him on his horns, held him pressed in that position against a wall for a considerable time. The point of one of the horns had been against the front of the man's neck during this time, and had made an extensive wound, but he was able to walk home after being released. There was no external hæmorrhage, but there were symptoms of severe shock, and his voice was nearly lost. Water, which was given him to drink, immediately flowed out through the external wound. The larynx was also perforated, so that a lighted candle was put out when held op-

[1] Another instance has been recorded by Henschen. Vide Lond. Med. Record, August 16, 1875.

posite to the wound. There was extensive suppuration, and the wound was left purposely open to allow the discharge of matter. . . . The wound healed completely by granulations.

The following cases of gunshot wound of the œsophagus have been recorded by M. Baudens :—

A soldier received a bullet-wound which passed through the middle region of the neck from left to right. The existence of a wound of the œsophagus was easily distinguished by the fact, that liquids taken in by the mouth escaped through the external wound. There was not very much pain, but there was intense thirst. A sound was introduced, through which fluids were injected into the stomach. He was able to relieve his thirst only by sucking some pieces of orange. . . . Later on, pressure, carefully applied, combined with the use of the actual cautery, effected a complete closure of the fistula.

The above case is worthy of notice, as the symptoms which were present are perfectly typical. The other case, having terminated fatally, possesses a different kind of interest.

A soldier received a bullet-wound in the left side of the neck. . . . Fluids which he drank passed through the wound. . . . The bullet could not be found on examination. . . . After death it was found imbedded in the body of the fifth cervical vertebra at a depth of half an inch.

Another case has been quoted by Mondiere in which the patient recovered, but with a permanent fistulous opening :—

The bullet entered immediately below the thyroid cartilage, and in its course destroyed the whole of the upper part of the trachea, and half the diameter of the œsophagus. . . . The man recovered, but deglutition was impossible, the loss of substance could not be repaired, and a large fistulous opening remained. During the remainder of his life, the unhappy man had to be fed through a tube, which was introduced into the stomach through the fistula.

A permanent fistula also remained in a case narrated by Dr. Gairdner[1] of a man who had cut his throat with a razor, and in so doing had divided the larynx at the upper part of the cricoid cartilage and the œsophagus[2] also. The man

[1] Edin. Med. and Surg. Jour., xvi., 353.

[2] ? pharynx.

recovered with an aperture in the front of the neck communicating with both œsophagus and larynx.)

Wounds of the thoracic portion of the œsophagus are necessarily much more grave than those of the cervical portion of the tube, from the much greater depth at which the organ is situated in this locality, and its close connection with the vital organs in its neighbourhood, some of which can hardly escape being involved by a wound penetrating to this depth. These wounds are nearly always either "punctured" or "gunshot;" an incision could not be conveniently made into the tube in this situation; and "lacerations" are, we believe, unknown, except those of the "spontaneous" variety, which we have already noticed under the heading of "Ruptures." Mondiere, who met with *five* cases of wounds of the thoracic portion of the gullet, saw but one recovery. He does not give the details of any of the cases. The following interesting case of punctured wound followed by recovery has been quoted by Nelaton[1] from Boyer:—[2]

A young man, æt. twenty-four, of robust constitution, received a bayonet-wound in the anterior and superior part of the right side of the thorax. After receiving the wound, being animated by a powerful feeling of self-preservation, he fled, pursued by his would-be-murderer, without stopping, till he arrived at his own house, a distance of half a league from the scene of the encounter. During this period he felt no pain, but soon after he was attacked with some paroxysms of cough, in the course of which he brought up some blood-stained sputa. M. Payen saw him an hour after the receipt of the wound: he found him, in a state of inexpressible agony, lying on his right side; respiration was laborious; acute pain was felt over the whole of the right side of the chest, and passing down to the iliac crest on the same side. the pulse was full and frequent, the slightest movement was difficult and painful. An angular wound presented itself between the third and fourth ribs, and at a distance of an inch from the margin of the sternum: it was about four lines in extent. There was very little hæmorrhage; but at each expiration, and still more during cough, air was expelled forcibly and was able to extinguish a candle at a distance of seven or eight inches. . . "On pratiqua une forte saignée du bras, et trois heures après une seconde

[1] Elem. de Path. Chir., iii., 477.

[2] Traite de Malad. Chir., vii., 120.

saignée. Celle-ci produisit du soulagement." . . . On the third day, when the dressings were removed, a great quantity of a very red liquid, of less consistence than blood, escaped from the wound : this diminished the anxiety, which had re-appeared. From that time the discharge continued without intermission, and even escaped in jets, when the wound was uncovered, and the patient coughed. . . . . "Je soupçonnai alors," writes M. Payen, "que la quantité prodigieuse de liquide que versait la plaie etait fournie par les boissons, qui, au lieu de descendre dans l'estomac, tombaient dans la cavité thoracique droite, en passant par une plaie faite à la partie moyenne de la portion pectorale de l'œsophage. Pour en acquerir la certitude, j'administrai au malade des potions huileuses, des boissons mucilagineuses diversement colorées, un lait de poule, &c. ; toutes ces substances venaient mouiller les compresses sans être dénaturées.

"Après avoir examiné avec soin la forme et les dimensions de la baïonette qui avait fait la plaie, je jugeai que celle-ci devait avoir peu d'étendue, l'instrument ayant dû s'arrêter sur la colonne vertébrale, après avoir traversé l'œsophage de part en part. Deux moyens se présentaient pour l'indication que j'avais à remplir : le premier consistait á introduire, par la méthode connue, une grosse sonde de gomme élastique dans l'œsophage, destinée à porter les boissons au délà de la blessure, et même jusque dans l'estomac ; le second n'était autre chose que la privation absolue ou presque absolue de boissons pendant plusieurs jours. Je préférai le dernier comme plus simple et moins incommode ; il ètait d'autant plus exécutable, que la soif était devenue moins pressante par la diminution des accèdents inflammatoires. Le malade s'y soumit avec docilitè ; je lui permis seulement de se refraîchir la bouche de temps en temps avec un petit quartier d'orange. Je lui fis administrer des lavements nourrissans ; mais, affaibli par les saignées et le traitement antiphlogistique, le malade éprouva au bout de quatre jours des besoins que ne pouvait plus apaiser son nouveau régime ; je cedai à ces instances, et lui permis d'avaler quelques cuillerièes de boisson. Le liquide fourni par la plaie n'en devint pas plus abondant, et bientot cet écoulement ne fut que purulent, ce que j'attribuai à l'épuisement total du liquide anteriéurement épauché ; enfin, devenu plus hardi par ces sucèes, je passai aux boissons alimentaires, et bientôt aux alimens solides."

This patient's condition gradually improved, nevertheless he was yet unable to lie in any position but on the right side, and some fever still remained, with occasional rigors. . . . He made the first trial of his returning strength in the country thirty days after the accident had happened, when, after a somewhat too free indulgence at table, he had an attack of indigestion. The efforts of vomiting which followed ended in the expectoration of a large quantity of pus, which continued to be brought up at intervals during the next fifteen days : with its

cessation the fever and oppression disappeared, and did not again return. "Les forces revinrent lentement, et le malade ne put reprendre les functions de sa place que plusieurs mois aprés sa blessure."

Diagnosis.—When the liquids which are swallowed by the patient escape, wholly or in part, through the external wound, it may generally be assumed that the œsophagus has been laid open. But this is not to be taken as an infallible sign, for it must be remembered that in some cases when only the larynx has been divided, liquids will enter by the glottis and escape through the external wound without exciting any irritation of this organ, and, indeed, without the consciousness of the patient. This occurrence—which is due to the loss of sensibility of the parts—has sometimes led to an error in diagnosis. As Erichsen remarks, it only happens in very bad cases.

Mondiere is of opinion that, in the absence of the sign we have mentioned, we should suspect that the œsophagus is engaged in a deep wound of the thorax when the patient complains of violent *thirst*, and more especially of continual *hiccup*. This latter symptom was observed by Mondiere in most of the cases of wound of the œsophagus which he had seen, and he cites examples in which it had been observed by M. Etienne, Jacobus Bontius, and Heister. This symptom, it will be remembered, has been found to be present in most cases of inflammation of the œsophagus, also in ulceration, spasm, and other cases in which there was irritation of the interior of the tube from various causes.

CHAPTER XIV.

SYPHILITIC AFFECTIONS OF THE ŒSOPHAGUS.

Although occasional examples of what appeared to be syphilitic ulceration of the œsophagus have been noticed by writers on the subject from a comparatively early period, the reality of the existence of lesions of such origin in this organ was, nevertheless, till within the last few years, an unsettled point in pathology. The fact that syphilitic disease of the œsophagus had been doubted by most writers, and totally denied by a large proportion, is sufficient proof of the rarity of its occurrence. We know that syphilitic affections of the alimentary canal usually confine their action to its extremities: the mouth and pharynx on one hand, the anus and lower end of the rectum on the other. The gullet, stomach, and small intestines are, in general, exempt, and it is well that they are so, since the lesions which do occur in those organs have a special tendency to produce contraction of their calibre, with all its terrible results. The impossibility which exists of observing them in their early stage, and of following them in their course, has rendered their study difficult and unsatisfactory; and the difficulty is enhanced by the rarity of these manifestations and the insufficient number of facts which have been collected concerning them.

One of the first writers who has mentioned syphilitic ulceration of the œsophagus is Severinus:[1] "Culto anatomico tradita cadavera variorum syphilide extinctorum exhibebant exulcerationes, tum in œsophago, tum in trachea." Rhodius has given another case of œsophageal disease, "to which it

[1] Lieutand, Hist. Med., t. ii., lib. iv., Obs. civ. (quoted by Lancereaux, "Treatise on Syphilis." Syd. Soc. Trans., i., 311).

would be, perhaps, possible to attribute to a syphilitic origin." Paletta observed one case which he believed to be of this nature. In this instance dysphagia arose after the suppression of leucorrhœa and the disappearance of a papular eruption. Two cases of this kind which have been recorded by Carmichael are rejected by Lancereaux as inconclusive and leaving "doubt in the mind." Wilks believes that syphilitic stricture of the œsophagus sometimes, though very rarely, occurs. He refers to a specimen preserved in the museum of Guy's Hospital as an example, in which a contraction exists at the junction of the pharynx with the œsophagus: this he believes to have followed a syphilitic ulcer. Virchow describes a similar case. Follin saw two cases of œsophageal dysphagia which might have been connected with syphilis. In one of these cases there was palmar psoriasis co-existing with the affection of the gullet, and the patient recovered completely without the use of the sound; in the other, the lesion was more deep-seated, and the cure was not complete; "these were, doubtless," that author observes, "cases of cicatricial lesion, which may be ameliorated, but cannot be cured."

Although the records of the above cases were familiar to many of the writers on the subject, the evidence in all was looked upon as inconclusive, and many of the highest authorities on pathology have entirely ignored the existence of syphilitic disease of the œsophagus. Rokitansky, usually so ample and lucid in his descriptions of the morbid phenomena of the various viscera, does not even allude to it, though he he has carefully enumerated and classified the "textural diseases" of the œsophagus. No distinct mention is made of this cause of contraction of the œsophagus in the "Manual of Pathological Anatomy," by Jones and Sieveking. Nelaton, after describing most thoroughly the different kinds of contraction of the œsophagus, hints at the possibility of its arising from secondary syphilis, but evidently is indisposed to admit the probability of such an event. This is indicated by the following words:—"Pour compléter cette longue énumeration citerons nous les rétrécissemens syphilitiques?

Ceux-ci ne paraissent pas établés sur des observations assez exactes, pour que nous pouvons les admettre sans aucune reserve, et si certains cases de rétrécissements ont pu être guéri par les préparations mercurielles, cela ne prouve pas rigorousement qu'il agissait d'une affection syphilitique." Acton details the numerous varieties of syphilitic sore-throat, giving a full account of their history and progress, and yet does not advert to the occurrence of stricture as one of the terminations of extensive and long-standing ulceration of the pharynx. In his instructive chapter on the causes of death from syphilis, no mention is made of such a cause, nor is there any allusion to it in his account of the symptoms of that state of the system, embracing many of the complications and sequelæ of tertiary syphilis, to which M. Ricord has given the name of "syphilitic cachexia." No case illustrating this feature of syphilis is to be found in the works of Vidal de Cassis, of Swediaur, or of Ricord himself; nor even is there any allusion made to it by Yvaren, whose work on the "Metamorphoses de la Syphilis" includes nearly all the obscure forms of syphilitic disease so far as they are known.

A case which is very interesting to us in this inquiry, inasmuch as it evidently shows that the disease had attracted the attention of some of the older writers on syphilis, has been recorded by Daniel Turner, and is quoted by West, from whose valuable paper on this subject we have taken it. The case is one of "a person several years advanced beyond his meridian, and, for many of these last past, a great friend of the bottle," who became exceedingly emaciated, and suffered much from a cough which his physicians attributed to phthisis. On his being placed under Dr. Turner's care, he, according to the graphic description of the latter, "appeared a very frightful object." He says, "On depressing the tongue, I found the uvula gone, with the greater part of both amygdalæ, the whole palate, and behind, on the muscles of the pharynx, as far downwards as could be seen, over-run with *depascent ulcers* covered with sordes; and it was with much difficulty, holding my ear to his mouth, that I could understand one word in three, though straining himself with his

utmost effort to pronounce them. I then applied to his relations, inquiring how he got down his nourishment, who told me that his liquor, here of late especially, though given by spoonfuls, returned instantly by the passage of the nostrils; and that any other aliment, as chicken-broth, with bread or panada, could find no admittance to his stomach; for that the muscles, inservient to the swallow, being preyed upon by the virulent humours, tied down, as it were, and withal so tender, that they were unable to perform their office; insomuch, that in *like manner with those labouring under a cancer of these parts, he was in real danger of being famished, through want of conveyance of sustenance to the same.* This was indeed the real case of this unhappy man, who, as I understood by his friends, had not for many days past been able to let down his nourishment of any kind."

A previous attack of the venereal disease having been admitted by the patient, he was at once treated by cinnabar fumigations, and with so much advantage, "that the miserable man, who just before could not let down one drop of broth or gruel of any kind, by the time a month was expired, devoured a large chicken at a meal; his drink also, taking heed in swallowing leisurely, passing with very little rising up to the passage in the nose." . . . "The fume did all in this surprising recovery."

In reviewing this case Mr. West observes, "The nature of the disease in this case cannot be questioned: that narrowing of the œsophageal canal existed is amply demonstrated by the symptoms, and that such was the doctor's own impression is evident from his comparing the symptoms to those which would be found in any well-marked case of cancerous degeneration. The success of the mercurial treatment further assists in proving the correctness of Dr. Turner's diagnosis." But Mr. West, when writing these words, must have been ignorant of, or, at least, must have overlooked, the fact that symptoms similar to those caused by stricture of the œsophagus have been constantly observed in connection with *ulceration* of the lining membrane of the tube, which, in the opinion of the

present writer, was much more probably the real state of things in the above-mentioned case.

In the two cases bearing upon this subject which have been recorded by Carmichael (already referred to in the early part of the present chapter) the prominent condition was that of "ulceration" of the back of the pharynx. The first was that of a man who was admitted into the Richmond Hospital "on account of an extensive ulcer at the back of the pharynx, the entire of which, as far as could be seen, was engaged in the ulceration, and covered with a white slimy adhesive matter. The velum and surrounding parts were inflamed; and he swallowed with pain and difficulty." After three weeks' use of the antimonial solution, with a gargle of borax and honey, he was ordered mercurial frictions." For two months this was persevered in, although at the end of three weeks "his mouth was severely affected by the mercury." Upwards of six ounces of ointment were used, yet very little benefit resulted from it: "the ulcer of the pharynx looked foul," and "was almost as extensive as at the time of admission." Sarsaparilla in powder and decoction was next ordered. This he took for four months as an out-patient, when "he was again admitted with the same ulceration as before on the pharynx." Recourse was again had to the mercurial frictions; and for six weeks salivation was kept up. At the end of this time there was some amendment, which was once more followed by relapse; but at the end of thirteen months he was, after a third course of mercury, discharged, with directions to return if he again became ill.

Carmichael's second case was that of a female with a history very similar to the preceding, but the dysphagia was still more marked. Throughout the whole course of this patient's illness "difficulty of swallowing" was the prominent symptom; and at the end of six months, during which time she had been several times brought under the influence of mercury, without receiving the slightest benefit, she was removed from the hospital by her friends, who saw no hope of her recovery, the ulceration continuing to extend in spite of the treatment.

A unique case of ulceration of the œsophagus communi-

cating with fistulous opening on the side of the neck was brought under the notice of the Pathological Society on the 16th of March, 1839. Mr. Cusack, who exhibited the morbid specimen, believed that the œsophageal ulcer was syphilitic in its nature. The man had been affected with "venereal," and had taken mercury irregularly. He was admitted into Steevens' Hospital in a broken-down state of health. At the time of his admission there was a remarkable fulness of one side of the neck, with two tumours, one on each side of the mesial line, above which were situated ulcers apparently of a venereal character: another existed near the clavicle. The patient improved under the use of sarsaparilla; a small quantity of mercury was then exhibited; subsequently it was found that the greater part of his food and drink escaped through the fistula in the neck. . . . The patient died suddenly with symptoms of peritonitis from perforation. On post-mortem examination, the perforating ulcer was found in the small intestines; the ulcers in the neck were found to communicate with the œsophagus by two openings, around which the appearances of disease in the tube were much slighter than could have been expected in a case of the kind. Mr. Cusack, however, believed that the ulcerative process had commenced in the œsophagus.

The above cases must be considered, we think, with the fairest show of probability, as due to syphilitic disease. But with regard to Carmichael's cases, we must observe that there is the same objection to the hypothesis which Mr. West rather confidently advances—"that the true cause of the exhaustion was a narrowing of the canal of the œsophagus"—which we have already mentioned in connection with Turner's case, and we would feel much more disposed to refer the symptoms to the "severe and protracted ulceration" which, as had been already shown in an earlier part of this essay, often gives rise to dysphagia as complete as that caused by the existence of the narrowest organic stricture of the canal.

One of the few cases of œsophageal dysphagia which has come under the notice of the present writer occurred in the person of a patient who was admitted into the —— Hospital

under the care of Mr. ——, in the early part of the present winter. He was suffering from tertiary symptoms, the result of syphilitic disease which he had contracted about ten years previously. He had nodes on several of the superficial bones, and there was a deeply excavated ulcer situated on the posterior wall of the pharynx. He was progressing favourably under the treatment adopted, when the symptoms of œsophageal obstruction set in rather suddenly. The patient first observed that the bolus in its descent was momentarily arrested at a point corresponding to about the centre of the sternum, after which it was allowed to pass without further obstruction into the stomach. The delay soon became greater: at the end of about three days from the commencement of the symptoms even fluids could be got down with difficulty, and solids not at all. The attempt to swallow gave rise to the sensation of a "ball gathering" at the point of obstruction, and this sensation was followed, a day or two later on, by the immediate rejection of the substance swallowed, whether solid or liquid. Recourse was now had to nutrient enemata for the sustenance of the patient. The eminent surgeon under whose care the patient was placed was disposed to attribute the œsophageal obstruction to pressure caused by a node springing from the anterior surface of the body of one of the upper dorsal vertebræ. No tenderness could, however, be detected upon pressure or percussion over the spinous processes, and this fact, combined with the rather sudden appearance of the symptoms, and the spasmodic state of the muscular fibres of the canal—as shown by the feeling of a ball which the patient complained of—caused him to abandon his first diagnosis, and to incline to the belief that the dysphagia was really due to ulceration of the lining membrane of the œsophagus, which led to spasmodic closure of the tube each time that the ulcerated surface became irritated by contact of the ingesta. The subsequent course of the case confirmed this latter view. When all power of deglutition became lost, medicine as well as food was given by the rectum, and large doses of the iodide of potassium were now administered in this way. After the lapse of about five days slight power of

swallowing was regained, and the function was almost completely established at the end of another week; the sensation of the "ball" still manifesting itself occasionally whenever a large or an irritating morsel was swallowed; but this also soon disappeared.

The above case presented, we think, the symptoms of "narrowing of the œsophageal canal" quite as well marked as did some of those which Mr. West has adduced as examples of this condition. But we believe that it will be allowed that—apart from every other consideration—the sudden onset of the symptoms in the case which we have mentioned, and, still more, their equally sudden disappearance, are inconsistent with the existence of an organic stricture.

But although we have taken the liberty of dissenting from the views of Mr. West with regard to some of the cases which he has quoted, we freely accord to him the credit, which is undoubtedly his due, of being the first writer by whom was established the probability, if not the absolute certainty, that stricture of the œsophagus may be due to syphilis. Indeed, since the publication of his valuable paper on this subject, syphilitic disease of the œsophagus—which had been previously ignored by almost all writers—has received its due share of consideration in every treatise on syphilis.

Of the two cases which were first published by Mr. West, the first was that of a girl, æt. twenty-one, who had for several years suffered from well-marked syphilitic manifestations, such as a scaly cutaneous eruption, sore throat, &c. "She had had gonorrhœa three years ago, but denies having ever had sores or a bubo." At the time of her admission into hospital her condition is described as follows:—"She now complains that she cannot swallow anything, and that her food returns during the act of swallowing: about twice a-day she is able to swallow without much difficulty. She has no pain except during deglutition. The throat is very much ulcerated, both tonsils, as well as the fauces and soft palate, being involved; the surface is ash-coloured, with red patches dispersed here and there. She is much emaciated, and very anæmic. Pulse weak; tongue clean; bowels open; urine scanty, but clear

and healthy." She was "ordered five grains of iodide of potassium in an ounce of decoction of bark three times a-day, and to use the hydrochloric acid gargle." Nitrate of silver was afterwards applied to the throat, and mel boracis as a gargle.

"This treatment was persevered in till the 28th instant, but without benefit; she got weaker, and the ulceration of the fauces became more extensive, while swallowing was even more difficult; she took scarcely any food, and had no relish for anything. An attempt was made to pass a small-sized œsophageal bougie, but it was ineffectual. . . . Attempts were made every other day to pass a gum elastic catheter, and, although the stricture could not be penetrated, yet, when pressure was made against it for a few minutes, she generally found that she was enabled to swallow better after a few hours." No improvement having occurred from the various forms of treatment which had been adopted, it was determined, on the 10th of July, to try the effect of a course of mercury, "in spite of her debilitated state, and for some short time, indeed, it seemed to give relief:" a slight amendment was perceived; deglutition was less painful and difficult. On the 6th of August this transient amelioration had ceased. "She had relapsed into her former condition, and could not swallow anything for hours together, all attempts at deglutition being attended with the most painful straining and spasm." She died, exhausted, on the 2nd of September.

On post-mortem examination, it was found that "the upper portion of the œsophagus, for about four inches, was much dilated; its mucous membrane thickened, and marked by spots having the appearance of recent cicatrices. At this distance from the upper end it was suddenly constricted, and terminated in a narrow canal which would barely admit a No. 4 catheter. This constricted portion, which was about two inches and a-half in length, was formed by the thickening of the mucous membrane, and by fibrous deposits in the form of bands and bridles, having very much the appearance of an old stricture of the urethra. Below this tract the œsophagus continued perfectly healthy to its termination in the stomach. . . . . ."

In reviewing this case, Mr. West expresses his grounds for believing that the lesion which existed was of specific origin :— "The fact of stricture of the œsophagus in this case was perfectly patent, and it remains to consider whether any cause, other than that to which I have referred it, can have produced this lesion. Certainly no positive proof of the primary sore can be advanced, but the secondary symptoms extending over a long series of years are distinctly marked; and in how very many cases do we find persons in the class of life of this girl denying that they have ever had sores, when their effects are but too plainly visible in the scarred skin, the ulcerated throat, and the carious ossa frontis and tibiæ of the sufferers. Such a sore, no doubt, existed at some period of her career, and its probable site was manifested in the post-mortem examination by a cicatrix in the lower part of the vagina. We have no account of the swallowing of any caustic or irritating fluid, so that we cannot attribute the stricture to that cause. But we find a patient gradually exhibiting the symptoms of well-marked syphilitic cachexia, and also experiencing frequent ulceration of the fauces and pharynx. At first, slight dysphagia alone led to the suspicion that there was narrowing of the œsophageal canal; but, with its persistence and tendency to become worse, the suspicion became augmented, until at last all doubt was removed on an attempt being made to pass a small-sized œsophagus bougie. . . . . The presence of numerous recent cicatrices clearly indicated that ulceration had existed in the walls of the œsophagus. The deposit in the submucous tissue was fibrous; it was exactly similar in nature to that which is so well described by Dr. Wilks as characteristic of syphilitic ulceration, and could not, under any supposition, be referred either to cancerous or tuberculous degeneration."

The description referred to, which Dr. Wilks has given of a syphilitic ulcer, is as follows :—"When a syphilitic ulcer is examined after death, it may generally, I think, be told . . . . by the adventitious fibrous deposit or lymph, which is formed in the tissue; and thus, besides the ulceration, you find the adjacent parts much thickened and indurated."

The second case recorded by the Birmingham Surgeon is of much less importance than the one already given. It is that of an unfortunate, aged twenty-five, who had been the subject of primary syphilis in her sixteenth year, and "had been treated by mercury. . . . . Secondary symptoms soon, however, began to manifest themselves, and since that time she has never been free from them. Almost every variety of syphilitic cutaneous eruption, rupia, lepra, and acue, each and all have in turn affected her; she has had nodes on many of the bones, ending in caries of the skull at one time, and of the os unguis at another, and in the latter instance giving rise to fistula lachrymalis. She has repeatedly been the subject of sore throat; the uvala and amygdalæ have been destroyed, and the soft and hard palate have been honeycombed by ulcers at various times, so that there are now various fistulous openings communicating with the nares: latterly aphonia has been present for weeks together, from implications of the larynx; and dysphagia has existed with greater or less intensity for the last twelve months. . . . . She cannot at the present time swallow any solid food, and often for several days even fluids refuse to pass, and regurgitate by the nose and mouth. The throat has an ashen-gray appearance, is covered with thin frothy mucus, and has the marks of many old as well as recent cicatrices; the whole of the posterior wall of the pharynx is gone, and only a thin, but dense, cicatricial membrane appears to cover the vertebral column. About four inches down the œsophagus an obstruction is met with, when a medium-sized œsophagus bougie is passed, but a No. 12 urethral catheter can be introduced with but a slight 'hitch.'"

In this case "every kind of treatment had been adopted," and sometimes "great benefit of a temporary nature" was experienced. The iodide of potassium proved more useful than anything else. Mr. West, at the time of publishing the case, had no hope that life could be prolonged for more than a few months. (She was alive six months after when his second paper appeared.)

A third case of syphilitic structure of the œsophagus was

met with by Mr. West a few months after the publication of the two preceding, and was also immediately communicated by him to the "Dublin Quarterly Journal of Medical Science.' It occurred in another female, a widow, aged twenty-five, who was admitted into hospital, July 12, 1859, with secondary syphilitic rupial crusts, and ulcerations over the face and legs.

"She was reduced to a desperate condition of anæmia and prostration when she presented herself for admission at the Queen's Hospital; syphilis had ravaged her never very vigorous constitution for months before she sought medical relief; and it was only by the constant administration of support and stimulants that her life was prolonged during the six months that she was an inmate of that institution. . . . . She stated that she contracted sores from two to three months before the rupial crusts appeared, but that she underwent no treatment for them, and was unaware of their nature till a week before admission, when a surgeon who examined her declared them to be syphilitic. . . . . Mercury in the form of dry calomel fumigation, carefully used until slight salivation was produced, was thought at first to have caused some of the sores to heal up; but although it may have had that effect, it probably tended at the same time to reduce her strength, and to aggravate the debility and cachexia which the syphilitic poison by itself is prone to excite in such constitutions. Iodide of potassium did not give any decided signs of amendment; but it never could be fairly tried, in consequence of the diarrhœa which its administration produced. . . . Difficulty in swallowing food and medicines began to be noticed about the end of December; it attracted little attention, however, as her general condition was so bad as to preclude the hope of satisfactorily treating any affection of the fauces or œsophagus to which it might be owing. Constant exhibition of stimulants and fluid nourishment was necessary; ether and ammonia were in requisition every few hours, to ward off the fatal termination which was anticipated, and even thought to be imminent every day during the month of January, 1860. . . . . She lingered on till the 4th of February, when death put an end to her sufferings."

On post-mortem examination "the œsophagus presented a reddish, livid erosion of the mucous membrane at its lower part for about two inches, more especially just above the cardial orifice of the stomach. There was no deep ulceration or marked constrictions, but considerable fibrous deposit in the

submucous tissue, which apparently diminished the calibre of the canal immediately above the chief erosion. . . . The mucous membrane of the stomach was throughout softened, and an irregular shallow ulcer, the size of a shilling, was formed on the lesser curvature."

In his remarks on the ulcerated condition of the œsophagus Mr. West observes that "its extent and intensity were not so great as to seriously impede the passage of fluids, but solid nutriment was, during the last five weeks of the patient's life, taken with considerable difficulty, and it is more than probable that had the reparative powers of her constitution been greater, the ulcer of the œsophagus would have shown a tendency to cicatrise, and, from its cicatrisation, diminution of the calibre of the canal would almost inevitably have resulted."

The present writer is of the opinion that this case strongly corroborates the view which he has already expressed, that the dysphagia in these cases of ulceration may completely simulate that due to constriction of the tube, so much so, that in some cases the diagnosis can only be settled by the use of the bougie, or, as in the present case, by a post-mortem examination. We have little doubt, from the observations which Mr. West made during the progress of this case, and from the arguments which he used in those cases which he has quoted from other writers, that, had no inspection of the parts been obtainable in this instance, he would have set it down as one of true organic stricture of the œsophageal tube.

A case of syphilitic stricture of the œsophagus has been placed on record by Professor Maury, of Philadelphia, in which recourse was had to gastrotomy, after it had become impossible for the smallest quantity of food, solid or liquid, to enter the stomach, and the finest bougie could not be got through the constricted portion of the tube. Before the operation the patient had been kept alive for several weeks by the aid of nutritive enemata, and was reduced, of course, to a state of extreme emaciation. He died of exhaustion fourteen hours after the performance of the operation. The post-mortem examination displayed a very tight stricture, free from all evidence of cancerous disease: it was situated just above

the cardiac orifice. The patient's syphilitic antecedents in this case were unequivocal, and Dr. Maury had not the least doubt that the lesion was of this nature.

Mr. West, by the publication of the cases which we have given, was the first to establish the existence of syphilitic disease, in the forms of stricture and also of ulceration, "in a canal which had hitherto been looked upon as more free from the syphilitic poison, and less frequently the seat of its organic lesions" than almost any other part of the human frame. Scarcely anyone, we believe, now ventures to question the fact—previously unknown to almost everybody—that this organ may sometimes be the seat of the ravages produced by the venereal poison.

Diagnosis.—From the very small number of cases of this nature which have been observed, our data are entirely insufficient to furnish signs definite enough to establish the diagnosis of the syphilitic affections which may engage the œsophageal tube, and the probability of their existence can be only suspected during life from the co-existence of other syphilitic manifestations with the symptoms of ulceration or stricture, as the case may be.

At the post-mortem table the distinguishing characters of such lesions are said by pathologists to be sufficiently well marked. We have already mentioned, in the words of Dr. Wilks, what the appearances are which serve to separate the syphilitic ulcer, when examined after death, from all others with which it might be confounded. The observations of Lancereaux[1] have led him to a similar conclusion:—"These affections usually present the characters of fibrous constructions, from which they differ only in their course and in the syphilitic manifestations which may accompany them. These two circumstances also serve to distinguish these contractions from all those which acknowledge a different cause."

Prognosis.—From the well-known power which certain

[1] Loc. cit.

medicines have in arresting the progress of syphilitic disease in whatever part of the body it may present itself, a more favourable prognosis would, perhaps, be justifiable in this than in other organic constrictions of the œsophageal canal, if the specific treatment could be adopted at an early period of the affection. But from the time when cicatricial tissue has filled in the site of the former ulcer, this form of treatment must become useless, and henceforth its course is the same as that of an ordinary fibrous stricture.

CHAPTER XV.

ŒSOPHAGEAL DYSPHAGIA.

The presence of dysphagia is by far the most important symptom to which disease of the œsophagus gives rise; for, although, as we have seen in the preceding pages, there are other symptoms which occasionally lead more rapidly to a fatal issue, yet it is to the existence of dysphagia that such a result is due in the vast majority of cases of disease of this canal. One of the most painful spectales which a medical man is called upon to witness in the discharge of his professional duties is that presented by a patient slowly, but surely, perishing from the gradual inanition caused by the existence of this dreadful symptom—due, as it usually is, to some condition which it is entirely beyond the reach of his skill to remedy. Commencing, perhaps, with a merely slight uneasiness felt as the morsel of food passes through a certain point in the course of the canal, or a slight "hitch" causing a momentary arrest in its course, the difficulty of deglutition gradually increases, first with solid matters, and soon after with liquids also, till at length it is found impossible to transmit any nutritive matter to the stomach, and the unfortunate patient rapidly succumbs, having suffered for days, or perhaps weeks, before death from all the agonies of hunger and thirst, or, in the words of Boerhaave, "tandemque, post Tantali pœnas diù toleratas, lento marasmo contabescit."

The conditions which give rise to the symptom of œsophageal dysphagia are very numerous. For the sake of convenience we shall divide them into three groups:—

I. Those due to some obstruction situated *within* the canal.

II. Those due to changes in its walls.

III. Those due to compression from without.

The first class embraces all those cases in which the difficulty in deglutition is due to the lodgment of a foreign body in the tube; also those in which a new growth, such as a polypus, having but a comparatively slight attachment to the interior of the wall of the canal, projects by the great part of its bulk into it. The pathology and symptoms of such growths have already received due consideration. We have also in the chapter on foreign bodies pointed out the varieties of dysphagia which may be caused by their presence. One of these is the mechanical obstruction caused by the more or less complete blocking up of the passage by the substance which has become impacted in it. Another is of a spasmodic nature, caused by the reflex spasm of the muscular fibres of the tube, arising from the irritation caused by the presence of the foreign body. In such a case deglutition may be completely impossible, although the bulk of the foreign body be entirely insufficient to occlude the passage. Other remoter consequences of the impaction of foreign bodies we have seen, which also give rise to dysphagia, and which shall be again more fully considered, under their proper headings, at a future page of the present chapter.

II. The second class of cases, which includes within its range all the examples of dysphagia that arise from structural changes which take place in the walls of the tube, is, perhaps, the most important of all. It includes by far the greatest number of cases of œsophageal disease which have been placed on record; and, we may add, that it is in cases of this class that the most decided tendency to a fatal result is seen.

All the cases in which constriction of the calibre of the œsophageal tube is caused by some change which has taken place in its walls have been divided by Nelaton into four groups, according to their pathology; and we shall adopt his classification, as we consider it to be based on sound scientific principles, and as it is also convenient for the purposes of description. The division which he has made is as follows:—

(1.) Those due to a thickening of the mucous membrane and submucous cellular tissue.
(2.) Those due to the formation of a cicatricial tissue.
(3.) Those due to hypertrophy of the muscular tunics.
(4.) Those due to the formation of new growths ("productions hétéromorphes"), such as cancer.

(1.) The thickening of the mucons membrane and submucous tissue, which is the essential feature in cases of this class, is invariably due, we believe, to a chronic inflammatory process, and hence it is originally due to some one or other of the many exciting causes which may set this process a-going. We have already traced the steps by which repeated attacks of chronic inflammation lead to this fibroid thickening, and, therefore, it is unnecessary to do so now. According to Nelaton, the mucous membrane alone may sometimes be the seat of the thickening, whilst in other cases the submucous tissue is also engaged. When the latter structure has undergone this change, "il se présente alors sous la forme d'un anneau elastique plus ou mouis épais. Cet anneau cède avec facilitè à un corps qui tendrait à le dilater, mais il reprend bientot sa dimension première, de sorte qu' il étreint le corps qui l'a franchi. Ces indurations vont en augmentant d'épaisseur, de telle sorte que le calibre de l'œsophage s'efface de plus en plus." It is proper to observe in this place that the distinguished pathologists, Wilks and Moxon, seem to doubt the reality of the existence of a simple fibrous stricture of the œsophagus. "Contraction or *stricture* is a form of disease very commonly spoken of, as if the œsophagus could be strictured in the same way as the urethra. This, however, is exceedingly rare, for in the vast majority of cases, where obstruction exists, it is due to disease within the tube, or to some tumour pressing from without: thus, if the cause be an organic one, a cancer of the œsophagus or aneurism of the aorta may generally be predicted. As, however, it is not often certain in the living subject that such severe affections cannot exist, the term 'stricture' must still be conventionally used in those cases in which there is a mere difficulty of swallowing; remember-

ing that it is exceedingly rare to find such a condition; for during several years' observation in the post-mortem room, we have never yet met with an instance of it." The experience of other observers, however, does not entirely coincide with that of the eminent authorities whose words we have quoted, and a sufficient number of cases has been recorded to establish, we believe, the existence of a simple fibrous stricture of the œsophagus as a pathological fact, although one of confessedly rare occurrence. A number of such cases has been collected by Mondiere, and published in that valuable series of papers on affections of the œsophagus, which appeared in the "Archives Générales de Medecine," and from which we have already so frequently quoted. The first example which he has given is briefly as follows:—

A patient who had been for some time troubled with cardialgia, and was also tormented by pain, extending from the xyphoid cartilage to the spine, applied for advice to Vater, "Un Medecin de Wittemburg.' The latter, who attributed his condition to the presence of irritating matters in the stomach, employed emetics. No benefit resulted from their use. The patient was now harassed by an obstinate cough, accompanied by nausea, and followed by the discharge of a great quantity of viscid mucus. Dysphagia appeared, and gradually increased till the patient was able to swallow only liquids, all solid matters being arrested by an obstacle which was perceived towards the cardiac end of the tube. Vater then began to suspect the existence of a polypus or scirrhus growth. . . . One day he suddenly felt a choking sensation in the throat, and rejected, by vomiting, "une masse charnue et membraneuse de la longeur et de la grosseur du doigt." After the expulsion of this body, he felt much relieved for some time, but the pain soon returned, and increased from day to day. The difficulty of swallowing also increased, so much that the patient was soon unable to get down any solid food, which was always rejected "par un mouvement de regurgitation." The passage of a sound revealed the presence of an obstruction, situated near the cardiac orifice, which it was unable to pass. A smaller instrument was afterwards got into the stomach, and after its withdrawal the patient was able to swallow somewhat better. The improvement was, however, but of very short duration, the dysphagia returned and gradually increased, and the patient died exhausted not long after.

The autopsy did not reveal the presence of any new growth in the inferior part of the œsophagus, "mais on trouva seulement, dans cet

endroit, *son calibre beaucoup diminué par l'epaississement de ses membranes*, qui offraient une teinte livide et bleuâtre, et une tache ressemblant à une cicatrice, comme si c'eût été sur ce point qu'eût été implanté le corps charnue que rejeta le malade."

We consider the report of this case perfectly satisfactory, and the symptoms are all clearly explained by the state of things which was found after death. We have no doubt that the original affection was an inflammatory process, which, in its protracted course, gave rise both to the thickening of the membranes and the formation of the polypus, the point of attachment of which was marked by the "tache ressemblant à une cicatrice" found in the thickened mucous membrane. The process by which chronic catarrhal inflammation gives rise to both the conditions which existed in this case—thickening of the mucous membrane, and formation of polypus—has been already fully discussed in the chapter on chronic œsophagitis.

Another case illustrating our views has been published by Howship.[1]

A man, æt. sixty-six, was admitted into St. George's Hospital, complaining of dysphagia, for which he had been suffering for about six months. It had been gradually increasing since its commencement, and was then so extreme that it was only with the greatest difficulty that he was able to swallow a spoonful of water. He did not complain of any pain except that which was due to hunger.

On getting him to swallow a little water, it was observed that the liquid did not descend below the inferior part of the pharynx; a fit of coughing immediately followed, and the water was rejected by a movement of regurgitation. On making another attempt soon after, a small portion of the liquid was able to pass beyond the portion of the tube which appeared to be constricted; but the patient said that he found it stopped at the level of the pit of the stomach, and it was also rejected.

The passage of a bougie revealed the existence of a constriction of the upper part of the œsophagus. A very small instrument was got through with some difficulty, and the operation was followed by a slightly increased power of swallowing. This improvement was, however, very transient, and the patient soon aftewards died in an

[1] Practical Remarks, &c., p. 171.

extreme state of emaciation. A remarkable feature in this case was, that it was only during the last few days of his life that the patient was sensible of the obstruction which existed *at the lower end* of the œsophagus.

On post-mortem examination, the inferior part of the tube was found hard and thickened, and the portion next the cardiac orifice presented the characters of scirrhus. *The superior part of the œsophagus presented no appearance of constriction.* About two inches below the termination of the pharynx, some traces of inflammation began to appear, consisting in a thickness and opacity of the mucous membrane. That alteration extended to about four inches above the superior orifice of the stomach, and from that point the morbid change seemed to be chiefly situated in the muscular coat, which was thickened and hard, and displayed all the characters of scirrhus. Corresponding to this part, the calibre of the canal was almost completely obliterated, and at the cardiac orifice some ulceration was found to exist.

There are several points of great interest in this case. First, with regard to the symptoms, it is to be observed that the patient, up to a very short time before the fatal issue, referred all his uneasiness to the upper extremity of the tube, where in reality no morbid change existed. The passage of a sound, too, confirmed the idea that the seat of the obstruction was at the pharyngeal end. The explanation obviously is to be found in the fact, that, as we have already seen in other affections of the gullet, irritation of any part of the lining membrane of the tube produces tonic spasm of the upper end of the canal, where alone striped muscular tissue is found. To this reflex spasm was due the arrest of food at this point, the difficulty of passing a sound through, &c. The peculiarity of the pathological changes found after death are not less noteworthy; the inflammatory thickening in the upper part, the scirrhous degeneration lower down, and the ulcerated border at its inferior end. The inflammatory process was probably, in this case also, the first deviation from the healthy state; and the scirrhous degeneration then commenced in the lowly organised fibroid material which was deposited in the submucous connective tissue as a result of the chronic inflammatory changes. Many of the recorded cases of cancerous disease of the œsophagus have been preceded, as we are aware, by the symptoms of inflammation, and there is

little doubt that such was the case in this instance. The ulcerated border, which was found at the lower end of the scirrhous formation, is another example of the observation which was long ago made by Sir Everard Home—that ulceration, in cases of stricture of the œsophagus, nearly always commences at the cardiac aspect of the strictured portion. The theory by which he attempted to explain this apparently anomalous occurrence we have already noticed. Mondiere was of a different opinion as to the usual seat of ulceration, and shrewdly observes, that in such cases, vomiting (to the influence of which Home traced its occurrence at the cardiac side of the stricture) is very rarely met with. But there can be little doubt, we think, that in the exceptional cases, in which vomiting is a prominent symptom, it may have the effect which he attributes to it. With regard to the seat of the stricture, it has been found by most observers to occur most frequently at the pharyngeal extremity of the tube, next at the cardiac end, and seldomest of all in the intermediate portion. Sir E. Home,[1] in his observations on strictures of the œsophagus, remarks:—"there is this one spot immediately behind the cricoid cartilage, where the fauces may be said to terminate, and the œsophagus begin, in which such a contraction is so often met with, that I must consider it as more liable to become diseased than the rest of the canal."

As to the extent of the strictured portion, it may vary from a few lines, which is the usual length, to several inches, of which we have just seen a well-marked example.

A peculiar variety of constriction was once met with by Sir E. Home in the upper end of the œsophageal canal, to which he gave the name of "membranous stricture." The following is his account of the case, with the pathological condition found after death, which we will quote *in extenso*, as examples of this kind are very rarely met with:—

A lady, forty-six years of age, had from her earliest remembrance had a narrow swallow, but for the last two years had perceived it to be

[1] Practical Observations, 2nd Ed. ii., 395.

gradually getting worse, till she was unable to swallow anything but liquids without danger of being choked ; occasionally she could take some bread soaked in tea. In the night, after sleeping some time, she awoke with a sense of suffocation, and it was an hour before she recovered. At these times she lost her voice till she swallowed some water. She brought up at all times a great deal of mucus, particularly after speaking, but still more so after taking food, and she thought porter increased the quantity of mucus more than anything else.

Under these circumstances I saw her in January, 1798. She was of spare habit of body, very readily agitated, and her voice was below the usual pitch, like a person speaking below his breath, but loud enough to be perfectly distinct. I examined the œsophagus by a common bougie, and afterwards applied the caustic ; it gave little pain and brought on no irritation. She took a little ice cream after it, which cooled the parts and relieved them. The caustic was applied every other day for near three weeks. Her swallowing and voice were evidently improving, when one morning before getting up she had one of the attacks threatening suffocation, which was so violent as to induce me to bleed her and apply a blister to her breast ; a degree of fever came on which lasted two or three days. After the caustic had been applied fifteen times, she began to find that she could take nourishment with more ease, and in greater quantity ; her voice was also better. On the 20th of April she had a violent return of the attack of suffocation ; it was brought on by catching a severe cold, and did not go off. Her nights were very restless, and I wished her to change the air by going out of town ; this she declined doing, and on the following night another fit of suffocation came on, which terminated in death.

On examining the parts after death, the œsophagus and trachea were, with respect to external appearance, in a natural state. The mucous glands at the root of the tongue and fauces were unusually large. The œsophagus, immediately behind the cricoid cartilage, was contracted, forming a stricture ; this was unattended with thickening, and consisted of a fold of the internal membrane only. The orifice, through which the nourishment passed, was only large enough to admit the blunt end of a probe, and the black tinge from the use of the caustic was evident upon its edges, showing that the application had affected that part and was enlarging it. Between the stricture and the glottis the internal membrane of the œsophagus was thickened, but below the stricture the appearance was natural. The right lung was in a diseased state throughout its whole extent, and adhered universally to the chest.

The symptoms of suffocation, during the time she was under the treatment of the armed bougie, arose partly from the irritation it produced, but in a still greater degree from the diseased state of the lungs.

The annexed plate of stricture in the œsophagus gives an exact representation of the appearance the parts had in this case after death. (Plate XIII. is a copy of the one referred to.) It represents an internal view of the fauces and œsophagus. They are exposed by slitting them up from behind where they lie upon the spine, and turning the cut edges aside, so that the œsophagus remains attached to the cartilage of the larynx, thyroid gland, and trachea, by which means its relative position is preserved. The upper part of the plate shows a portion of the velum pendulum palati, and the uvula supported, so as to let

Plate XIII.

the light pass through between them and the upper surface of the tongue, a small portion of which is exposed. The velum pendulum and uvula have a tumid appearance, and the glands at the root of the tongue are unusually large. Immediately below the tongue is the epiglottis, on each side of which one of the tonsils is seen; the left is

most exposed. Directly under the epiglottis is the glottis; the membrane covering the arytænoid cartilages is much thickened. The fauces at this part have an infundibular form; the smallest part of the funnel is directly behind the cricoid cartilage, and it is at this part the stricture has taken place, forming a membranous partition across the canal, except at one part to the left side where there is a narrow passage through it.

Another example is given by Baillie, in which a constriction of the gullet precisely similar to the above was met with after death; he does not describe it, however, very minutely, and the history of the case has not been given.

(2.) Cases in which contraction arises from the formation of a cicatricial tissue are much more numerous than those of the preceding group. It is very frequently the result of the action of caustic liquids, such as concentrated acids, or strong alkaline solutions. We have already traced the steps of the formation of the stricture in such cases, and need not repeat them here.

Destruction of the mucous membrane of the œsophagus by the ulcerative process is also likely to be followed by cicatricial contraction, in cases where the ulceration does not end fatally in the beginning, or before any attempt at healing has taken place. This may result from violent inflammation, leading to a considerable amount of destruction of the mucous membrane; but it is more likely to take place as a result of the ulceration which follows the mechanical pressure of a foreign body. A remarkable instance of contraction due to the latter cause is cited by Mondiere. It was of a young man, in whose gullet a *demi-sou* had been lodged for thirteen years before death. The attempts which had been made to remove it had all utterly failed, and after suffering during this long period from all the inconveniences to which its presence gave rise, he died at length exhausted from inanition. For some years before death he had suffered from the ordinary symptoms of organic stricture of the œsophagus, and on examination of the organ after death, the part where the piece of money had been retained was found to be "dure et considérablement épaissie,"

so as to lead to considerable narrowing of the calibre of the canal at this point.

A considerable number of cases has been published from time to time by various writers, in which this result has followed the injury caused by a foreign body. Thus Gadelius[1] saw a case in which it followed the swallowing of a pin; Littre[2] has recorded a case in which it resulted from the injury produced by a fish-bone; Bagard[3] another, in which the offending agent had been a piece of bone; and other similar cases might be quoted. Darwin (Zoonomie) has expressed his belief that constriction of the œsophageal canal is often produced by the deglutition of hard and angular bodies in people who had lost all, or the greater number, of their teeth; according to him, those rough substances when swallowed *en masse* distend the tube and lacerate its lining membrane. This is followed by cicatrisation, which brings about the gradual formation of stricture. He has not, however, given any cases illustrating his hypothesis, and we have not found any in the course of our reading, in which such a result was traceable to this cause.

Causes.—Before we proceed to examine the symptoms common to the two sub-divisions of stricture which we have been just considering, we shall glance at some of the remoter and more unusual causes to which their formation has been in some cases attributed.

Mondiere says that a thickening and projection of the mucous membrane, leading to the formation of stricture, has sometimes been the result of long-continued spasm of the muscular fibres (œsophagismus), and Chelius thinks it "most probable that such spasmodic affection may end ultimately in a permanent stricture of this (the *membranous*) kind," yet he admits afterwards, that, "as this stricture has been found at the point where the larger pharynx is continued into the smaller œsophagus, it still remains unexplained why the

[1] Biblioth. Medicale, xxxix., 389.
[2] Mem. de Acad. des Sciences, 1716.
[3] Marquet, Traite Pratiq., p. 171.

great efforts to overcome the difficulty of swallowing, consequent on inflammatory or spasmodic action, should cause exactly at this spot such a fold-like projection of the lining membrane of the œsophagus." We think it much more likely that the spasm in such cases was merely symptomatic of the inflammatory process to which the formation of the stricture was due.

In two of Sir Everard Home's cases he attributed the origin of the affection to the irritation produced by prolonged vomiting. In the first of these, the obstruction appeared to be principally due to an inflammatory condition, and was attended by spasm of the œsophagus, which, of course, increased the dysphagia. (This case has been already alluded to in the chapter on œsophagismus.) The symptoms were relieved by the use of Sir Everard's never-failing caustic. The second was that of "a gentleman, aged fifty-four," who, "for twelve years felt occasionally a pain in the stomach, and in the last two years of that period the returns became much more frequent, attended with violent retching, without bringing off anything from his stomach but phlegm." After a severe attack of this kind he noticed a difficulty in swallowing, which gradually increased, and at length led to a fatal result.

In a case which has been recorded by Graef, he attributed this result to the abuse of strong liquors, and, above all, to the patient's habit of chewing tobacco, the juice of which he swallowed. Mondiere, who cites this case, considers the disease of the œsophagus in this instance to be analogous to the growth of cancer on the lower lip which was observed by Couturier in the persons of two inveterate smokers, and which was by him attributed to the irritation produced by the "liquide âcre qui suintait à travers le tuyau de la pipe."

The formation of stricture in the œsophagus has been observed in some instances to follow rapidly the suppression of certain unhealthy discharges which had long existed, and become habitual. A case of this kind has been recorded by Paletta.[1] It occurred in the person of a female who had for

[1] Exercit. Patholog., 226.

years been the subject of an abundant leucorrhœal discharge. All of a sudden it disappeared, and its arrest was quickly followed by œsophageal symptoms, ending in complete dysphagia, which soon proved fatal.

In another case recorded by the same writer the symptoms of stricture supervened upon the suppression of a papular cutaneous eruption.

Desgranges[1] published a case which occurred in a woman, who had been from her infancy subject to a "foule des maux," caused, as he says, by a "discrase strumeuse." On arriving at the age of puberty, she frequently suffered from headaches, and attacks of cold in the head, accompanied by a copious nasal discharge; "elle crachait habituellement beaucoup de matières épaisses, pituiteuses, et blanches." When about the age of forty-eight, the coryza ceased, to return no more, but but in its stead difficulty of swallowing came on, which rapidly increased, and soon led to a fatal issue.

In occasional instances the difficulty of swallowing has existed from the time of birth. Some people, it is well known, have during their whole lives a "narrow swallow." The Chevalier de Saint-Louis perished of inanition brought on by a gradually increasing dysphagia. Ever since his birth deglutition, more especially of solid food, had been accomplished slowly and with pain. Some months before his death these symptoms began to increase with great rapidity, and for several weeks before the fatal issue, nutriment could only be administered by the rectum. Sir E. Home's case of "membranous stricture," which we have already detailed in full, may also be adduced as an example of congenital narrowing of the tube, the lady having "had from her earliest remembrance a narrow swallow."

In some cases it would even seem to be hereditary. Those cases due to corrosion and those due to syphilitic disease have been already noticed.

Symptoms.—When occurring as the result of chronic in-

[1] Jour. de Corvisart, ii., 507.

flammation of the mucous membrane, the symptoms of stricture will have been, of course, preceded by those proper to that affection, which have been fully considered in the chapter devoted to that part of our subject. In a case recorded by Howship, the first symptom that appeared was a violent pain between the shoulders, which soon extended along the spinal column, and increased to such a degree that it seemed to the patient as if a red-hot iron were imbedded in the part. It was only some weeks later that the difficulty of deglutition began to appear. The constriction occupied the upper extremity of the tube. When the bolus became arrested at this point, the patient was able, by pressing the sides of the neck with his fingers and thumb, to get it past the obstacle, if the morsel had been previously well masticated.

It must be remembered also, that, in whatever part of the tube the stricture may be situated, the obstruction is at first referred by the patient to the pharyngeal extremity, and, when it occupies the lower end, the mischief is referred, as the case progresses, to different points of the tube in succession, proceeding from above downwards. A good illustration of this peculiarity has been afforded by one of the cases already quoted. One of the first to observe it was M. Brogua. In a case which he has recorded,[1] the difficulty in deglutition was at first referred to the lower end of the pharynx, then to a point corresponding to the middle of the sternum; lastly, to the inferior part of the tube, close to the cardiac orifice, which was the true seat of the malady. This writer believed this change of position to be due to the fact that "la matiere, qui constituait la maladie, a descendu et occupé successivement les différens points de l'œsophage." This theory, of course, requires no comment in the present day, but we regret that we are unable to offer any satisfactory explanation instead. That the obstruction so produced is due to tonic spasm of the muscular fibres of the tube, caused by the reflex irritation of the pneumogastric nerve, is, we think, sufficiently obvious, but why it should proceed in this slow and gradual course

[1] Recueil Periodique, xlii., 31.

from above downwards, is not so easy to explain. It looks as if the tonic contraction, having commenced with the voluntary muscular fibre above, fixed itself there till it had exhausted the irritability of the latter, and then proceeded downwards, behaving in the same way to the next portion of the muscular wall, and so on, by a kind of hyperbolically slow vermicular movement.

In another case of the same nature, which has been recorded by Lechevrel,[1] this singular phenomenon was so marked, that the physicians who treated the case felt confident, in the beginning, that they had to deal with a lesion situated in the lower part of the pharynx. "Le malade y sentait un embarras et un serrement que le bol alimentaire avait beaucoup de peine à surmonter; delà ce sentiment de gêne et de constriction se fit marquer, en descendant, sur tous les points du conduit œsophagien, comme s'il eût successivement occupé chaque portion circulaire des fibres qui le composent."

As the case progresses, and the constriction becomes still narrower, the aliments are, of course, arrested above the strictured portion, and then regurgitated. If the upper end of the tube be the seat of the lesion, they are rejected almost immediately, and accompanied usually by a large quantity of saliva and of viscid mucus: if, on the other hand, the obstruction be situated towards the lower end of the tube, a considerable period of time elapses before they are returned. The consequence of this is, that as the patient continues to take food, the ingesta accumulate above the seat of stricture, and distend the tube. Regurgitation may not take place for one, two, or even three hours after ingestion. In some rare cases arrest of the ingesta is followed by a sense of impending suffocation with violent efforts to get rid of the offending substance. This, however, is seldom observed, and the aliments, when arrested at this portion of the gullet, usually produce no other uneasiness than some feeling of distension and weight. The process of regurgitation, or

[1] Recueil Periodique, xlii., 145.

"œsophageal vomiting," by which they are then rejected, has been described in an earlier chapter.

Nevertheless, it must be remembered, that the matters which have been swallowed are not, as a rule, completely rejected. During the time that they are delayed above the stricture, the more fluid portions usually make their way, through the narrow opening which remains, into the stomach. In a case recorded by M. Cassan, the patient "avait la conscience de cette descente des alimens qui, disait-il, semblaient passer à travers une filière." This writer believed that a kind of digestion took place when the food was long delayed above the stricture, by which it was prepared for passing through. In the case referred to, he found after death that, "la poche formée par le pharynx et la partie supérieure de l'œsophage, était distendue par l'accumulation d'un coagulum blanchâtre, mêlé à une *véritable pâte chymeuse*." This œsophageal digestion was also supposed by Purton to take place regularly in his case of dilatation of the œsophagus, which we have already quoted in the chapter on that subject. This patient, suffered from gradually increasing dysphagia during the last twenty years of his life. At intervals there were exacerbations, during which he could only, with the greatest pain and difficulty, get any nutritive matter into the stomach. If by the efforts which he made, he was unable to get the aliments past the obstruction, he was obliged to reject them immediately, so that, instructed by experience, he allowed them to remain in the tube, "where they continued to lie for hours, and often for days, and were probably digested." After death "the interior of the dilated portion presented, though in a feeble degree it is true, the rugous appearance of the lining membrane of the stomach."

As the case progresses, the difficulty of deglutition, which (except where spasm co-exists) is in the earlier stages only observed in case of solids, increases to such a degree that even fluids are obstructed in their passage. As described by Monro,[1] "the patient perceives even fluids stop at a certain

[1] Morbid Anatomy of the Gullet, &c., p. 295.

part of the gullet; a guggling noise is then heard, like water passing through a very narrow channel, and a part of these, after being detained for two or three minutes, gets down, and the remainder is rejected, and escapes through the nose and mouth, or passes into the windpipe, and occasions violent coughing. A very great exertion is required to get over solids, and during the effort, many patients suffer from difficult breathing, and some even are convulsed." The difficulty of swallowing is greatly increased by any irritation, even by catching a slight cold. This was attributed by Monro to "an inordinate spasm of the muscles of the gullet being induced;" it is probably partly due to the inflammatory swelling, and this idea is confirmed by the observation made by Monro himself that under those circumstances, the regurgitation of food was "attended by the discharge of a great deal of phlegm," the latter being, as we have seen, one of the prominent symptoms in inflammation of the lining membrane of the gullet. This profuse discharge of ropy mucus, which accompanies inflammatory conditions of the œsophagus, has we believe, been often been confounded with salivation, and improperly described under that name.

With regard to the existence of pain in these cases, we believe that it is not an essential accompaniment of a strictured condition of the tube, but is probably due to the amount of irritation present, which is, in its turn, caused by violent efforts of deglutition, incessant regurgitation, &c.—all imposing a vastly increased amount of work on an organ, which, in its already diseased condition, is the less able to bear the additional strain. In some cases, however, as in that of Howship, already referred to, it is very severe. In one of Sir Everard Home's cases pain extended from the seat of the stricture upwards along the course of the gullet, and even to the base of the skull, from whence it radiated, along the line of the Eustachian tube, to the ear. "This pain returned at intervals, when no attempt was made to swallow, and lasted for about an hour; the periods of its return were irregular, and no cause of their return could be ascertained." After death, which was due to inanition, a stricture was found "just

behind the thyroid cartilage," which nearly obliterated the canal. Mondiere observes that the most frequent seat of pain is opposite the xiphoid cartilage, from which it extends upwards along the course of the vertebral column. Sir E. Home was of the same opinion, and their view is borne out by his own case, which we have just referred to, and those of Vater and Howship, already quoted in an earlier part of the present chapter. It is a diagnostic point which is of great importance to remember, as it has sometimes led to the mistake of referring the seat of the mischief to the stomach.

The difficulty of deglutition goes on progressively increasing, as a rule, to the close of the drama; but in some cases the power is suddenly restored towards the termination of the case. This occurrence must excite no false hopes on the part of the patient or of the medical man, as it always denotes that the "beginning of the end" has come. The fallacious improvement is due to destruction of the cicatricial tissue by extensive ulceration, which, of course, has the effect of opening up the way for the passage of food once more, but the transitory relief which is thus obtained is rapidly followed by the fatal termination. We shall allude to it again when we come to speak of the "complications" of stricture.

Diagnosis.—There are a great many pathological conditions which may be mistaken for organic stricture of the œsophagus. The reverse condition of dilatation simulates very closely, as we have already seen, the signs and symptoms of contraction of the tube. The diagnosis in this case can be easily made by the passage of a sound, which it will be necessary to use before a definite conclusion can be arrived at, for both the history and symptoms will be found extremely alike in some of these cases. Both may be preceded by the symptoms of chronic inflammation, followed by gradually increasing difficulty of deglutition; in both there will be regurgitation of food, with detention of a portion in the tube followed by its decomposition; this will be accompanied by an extreme fœtor of the breath. In both there will be occasional exacerbations of the symptoms; increased difficulty

in swallowing, with spasm of the tube, profuse discharge of mucus, and other signs of irritation, such as cough, hiccup, &c. It must be borne in mind that, in almost every case of long standing constriction of the tube, dilatation takes place above the seat of stricture, so that the two conditions will be found to co-exist in many instances. The fulness of the neck, which follows ingestion of food where the dilatation is situated in the cervical portion of the canal, is then no proof of the non-existence of stricture. The only sure test is the passage of a sound or bougie, which at once settles the point.

Paralysis of the muscular fibres of the œsophagus is another condition which might at first sight be confounded with stricture. The symptoms which accompany that lesion will be found sufficiently detailed in our chapter on that part of the subject; and will be still better understood by examining the results of the experiments made in connection with this point, which have been mentioned in the section on the physiological functions of the organ. The passage of a bougie will be decisive in this case also.

Spasm of the muscular coats has often been mistaken for permanent narrowing of the calibre of the tube. We have already fully considered the characteristics which distinguish this condition, and need not repeat them here. The history of the case, the constitution of the patient, the sudden appearance of the dysphagia, and its equally sudden disappearance at times; with a constant variability according to the character of the food, and the mental condition of the patient, should in all cases be sufficient to decide the question. The test of the passage of a bougie is not so satisfactory in this class of cases as in the others, as it will often meet with a very considerable amount of resistance which may mislead; but this resistance always yields after a little time to gentle steady pressure, after which a full-sized instrument can be got through without any difficulty.

The reflex spasm of the muscular walls of the œsophagus, which usually accompanies inflammation of its lining membrane, may also simulate constriction of the calibre of the canal. Indeed, in those cases, there is, co-existing with the

above-named conditions, a real narrowing of the tube due to the tumefaction of the inflamed membrane. But the history of the case, and the inflammatory symptoms, will be sufficient to establish the diagnosis. A much greater difficulty will be experienced when ulceration of the mucous membrane sets in. For a full consideration of the differential diagnosis of these conditions, reference may be made to the able elucidation of the subject by Dr. Gordon,[1] in his remarks on the case of perforating ulcer of the œsophagus, which he brought before the Pathological Society, on the 16th of December, 1855.

Stricture of the œsophagus may also be confounded with compression of the tube from without by tumours of various kinds, such as enlarged lymphatic glands, aneurism of one of the great vessels in its neighbourhood, exostosis of the vertebral column, &c. We shall not enter into the question of the diagnosis of this class of cases till we have first considered their pathology and symptoms.

The diagnosis from narrowing of the tube due to the presence of new growths in its walls is, probably, at least in the early stages, the most difficult of all. Cancerous stricture, however, which is by far the commonest of these, is generally, after the lapse of some time, sufficiently easily distinguished by the character of the constitutional symptoms which accompany it.

On the other hand, diseases of other organs have been sometimes accompanied by symptoms which led to their being mistaken for stricture of the œsophagus. A curious instance of this kind has been recorded by Monro. The patient had been attended by his father, with Drs. Wardrop, Keith, and Mr. G. Bell, by whom he had been treated for organic stricture of the œsophagus. The history is as follows:—

October 10, 1810.—A.B., æt. forty-five, has laboured for about two years under occasional fits of dyspepsia, which he ascribes to his sedentary mode of life. For some months past has had slight, though not constant, difficulty in deglutition, and pain about the middle of the

[1] *Vide*, p. 70, et seq.

sternum, which only is felt after swallowing, or in drawing a full inspiration, or in running, &c.

Oct. 16.—During breakfast observed, that on attempting to swallow bread along with his tea, it stops in the œsophagus for a few seconds ; a rumbling noise, as if from the discharge of wind, is then heard, and immediately after the food passes into the stomach. These effects are most perceptible at breakfast.

Oct. 17.—A probang was introduced, but in its progress was stopped, when about half-way down the œsophagus ; a large bougie was then passed, and a stricture felt distinctly.

Oct. 19.—The probang was again introduced, and with some difficulty surmounted the stricture. The introduction produces slight pain, which soon goes off, but he still swallows with much difficulty. The probang passed till the 28th. It was then attempted to retain a circular probang, of half-an inch diameter, in the stricture, but the great uneasiness it produced, immediately forced it out. Such a probang was passed with ease, several times beyond the stricture, but a considerable resistance was felt in withdrawing it. The patient was not relieved till the 9th of November.

Still complains of difficulty of breathing, on any slight exertion, and of constant pain about the sternum, stretching to the clavicles, which were much increased by a full inspiration. Soon after, being under the necessity of taking a short journey, during which he was exposed to cold, he was attacked by a slight quinsy on his return ; this increased all his symptoms of dysphagia, and prevented the introduction of even the smallest instrument. During a few days he used a mucilaginous mixture, with opium, and the symptoms remitted, and the probang passed as before.

The instrument was now only used once a fortnight. About the end of December, he was attacked with acute pain, tumefaction, and inflammation, in the superior part of the joint uniting the metatarsal bone with the first phalanx of the great toe of the right foot, for which he could assign no cause. By the use of leeches, saturnine applications, and blisters, the pain, swelling, and inflammation, were nearly removed by the middle of January. He had then a slight febrile attack, which lasted only two days, and left him in a better state of health than he had experienced for some months past. In about a week he had a second similar attack, which also suddenly disappeared in the course of two days, but left him much debilitated. On the 10th of March he vomited a considerable quantity of a dark-coloured mucous fluid, which was very fœtid. This kind of fluid was occasionally rejected. About the beginning of April his appetite almost entirely failed him ; he was troubled with constant flatulence and acidity in the stomach. There was also considerable tension in the epigastrium, and pressure here produced much pain and singultus, but at other

times he felt no pain in the stomach. To remove the oppression of the stomach, he used to excite vomiting, by which a quantity of thin black matter was with difficulty brought up, with considerable alleviation. If he excited vomiting immediately after eating or drinking, none of the food was ejected, but only the black coloured matter. At the beginning of May, his memory became greatly impaired ; at which time, though much reduced, he was still able to sit up and walk about. He was also often troubled with acute pain in both elbows, or in the left shoulder; these came on suddenly, and were not removed, until he became warm in bed. He continued in this way till he died, greatly emaciated, on the 26th of May. About a month previous to death, the probang was introduced, and passed nearly as easily as it did when first used.

Dissection : The cartilages of the ribs were ossified. The cavity of the thorax contained about one and a-half pounds of serous fluid. The lungs collapsed, were free from adhesions, and in other respects perfectly sound. The pericardium contained a few ounces of a similar fluid. The heart was free from disease. On opening the abdomen, the stomach appeared greatly distended, the right lobe of the liver from its superior edge, to a considerable extent downwards, was attached to that part of the stomach lying under it by strong adhesions, so that it was impossible to separate the one from the other, without laceration of their substance. The stomach being opened, was found to be filled with the same dark-coloured fluid that he vomited previous to death. The internal part of the stomach, to the extent of more than a hand-breadth over which the liver adhered, was in a state of fungous ulceration, with elevated and irregular edges. The contiguous parts were not inflamed, nor did the coats in the other parts of the stomach appear diseased. The pylorus was contracted, and that part of the stomach immediately above it enlarged in the form of a pouch. The orifice of the cardia was perfectly free, *nor could the least appearance of stricture or disease be traced through the whole extent of the œsophagus.* The small intestines were distended with flatus, and none of the matter found in the stomach could be traced in them. The great arch of the colon was contracted, and filled with hard scyhalæ. The liver, except in its adhesions to the stomach, was in a natural state. The gall-bladder was flaccid—the omentum was deprived of its fat—the spleen, pancreas, and kidneys were perfectly sound.

We thought this curious case worth copying *in extenso*, from the anomalous nature of the symptoms which were present. The explanation of the apparent stricture of the œsophagus is to be found, we have no doubt, in the fact that the malignant disease which engaged the upper margin of

the stomach had involved one or both pneumogastric nerves, and by the irritation of their fibres gave rise to the reflex spasm of the muscular coat of the œsophagus, which so closely simulated a permanent contraction of the tube.

A case has been recorded by Mr. John Shaw, in which ulceration of the larynx gave rise to symptoms corresponding so exactly to those of stricture of the œsophagus, that it was only (as in the case mentioned by Monro) by post-mortem examination that the mistake was rectified.

Another deceptive feature which is sometimes met with in these cases is the remission that is now and then experienced in the severity of the symptoms. Mondiere quotes a remarkable case from Heineken, of Bremen, which illustrates this fact in a striking manner. The patient, "apres avoir eprouve dés affections morales tristes et permanentes," began to feel an obstacle in deglutition; something seemed to him to prevent the morsel from passing into the stomach; it was immediately rejected, mixed with mucus. This symptom sometimes disappeared for several days together, during which time the patient was able to swallow without the slightest inconvenience. At other times, for a number of days in succession, "ce n'était qu'à l'aide de beaucoup de liquide qu'il parvenait à avaler une très petite quantité d'alimens solides." In addition to these symptoms, the patient experienced a disagreeable sense of pressure towards the middle of the sternum, which was much increased during deglutition. "Après des variations nombreuses dans lamarche et l'intensité de la maladie, celle-ci s'aggrava tout-à-coup, et la malade succomba après avoir vomi le sang pendant vingt-quatre heures L'autopsie fit découvrir une altération profonde de l'œsophage dans son tiers inferieur." The same remitting character of the symptoms was very remarkable in a case recorded by Leroux. The patient always came into hospital for treatment when the dysphagia was very troublesome, and left it, again and again, thinking himself completely cured. The fallacious improvement, however, became each time more and more transient, and was at length followed by the usual termination.

Complications and Results.

Dilatation.—Dilatation of that portion of the tube situated above the seat of stricture is a natural result of the obstruction to the passage of food. This gives rise to the formation of a pouch of greater or less dimensions, which, as might be expected, attains the greatest size in cases which progress very slowly. The mechanism of the production of these pouches we have already dwelt on at sufficient length. When this condition exists the symptoms proper to both conditions will, of course, be present, and will render it necessary to take some additional trouble in order to arrive at a correct diagnosis.

It is worthy of note that the eminent pathologists, Wilks and Moxon, have never, in the course of their enormous experience, met with a case of dilatation of the œsophagus, "not even where stricture exists, for the reason, I suppose, that little or no food is taken in such cases, and the disease, which is generally cancerous, runs too rapid a course for dilatation to occur." It must be remembered that they are also unacquainted with the existence of simple stricture of this canal, "not due to disease within the tube, or to some tumour pressing from without," which is the only form of obstruction at all likely to give rise to this condition. A considerable number of well authenticated cases are, however, on record, in which both these conditions co-existed, as well as still greater numbers in which each existed separately, of which we have already seen a good many examples.

Ulceration.—This complication of stricture has in many instances hastened the fatal result. It is of comparatively frequent occurrence in these cases; and this fact will be easily accounted for by remembering the great amount of irritation to which the narrowed portion of the canal is subjected, from the violent efforts of deglutition, the succeeding regurgitating movements, &c.: in short, from the enormously increased amount of work thrown on a part, when from its diseased condition it is all the less able to bear it. The

result is, that the lowly organised fibroid material breaks down under the strain, and an ulcer is formed at the seat of stricture. The observation of Sir Everard Home, that the ulcerative process usually commenced on the inferior aspect of the stricture, and the explanation which he offered of this apparently anomalous course, have been already noticed. The ulcerative process is particularly likely to occur, and also to run a rapid course when the vital powers are greatly depressed, and in such cases its occurrence is always the beginning of the closing scene. According to Mondiere, however, the ulceration usually begins above the seat of stricture, and this he attributes, at least in great measure, to "l'irritation que produisent et le séjour des matières alimentaires, et les contractions répétées du sac, pour chasser au dehors ces memes alimens;" but, he adds, "Il n'est pas aussi facile de trouver la cause de celles que l'on rencontre entre le retrecissement et l'orifice cardiaque de l'estomac." He objects to the explanation offered by Home: "Nous ferons une seule remarque à cet égard; c'est que, dans la maladie qui nous occupe, le vomissement, en prenant ce mot dans l'acception qu'on lui donne ordinairement, est très-rare."

The progress of ulceration is marked by a much lower train of constitutional symptoms than had previously existed, and if extensive the patient soon dies exhausted by the hectic fever to which it gives rise. Much more frequently, however, the fatal result is due to extension of the ulceration through the wall of the canal into the surrounding parts; where it may either open into one of the great vessels in the immediate neighbourhood, and give rise to rapidly fatal hæmorrhage; or it may open into the trachea, bronchus, or lung itself, with an equally certain, though more protracted, result; or, lastly, it may give rise to profuse suppuration in the loose cellular tissue around, which extends sometimes all along the whole length of the tube, as it lies in the posterior mediastinum, and may even encircle it with an immense reservoir of purulent matter.

An interesting case of stricture of the œsophagus—ending

in ulceration—was exhibited to the Pathological Society by Professor Harrison :—

March 9, 1839.—The patient, a female, had not applied for advice till within a few days of her death ; she was then unable to swallow either fluids or solids, and life was supported by injecting port wine into the stomach through a tube, in passing which considerable difficulty was experienced about the centre of the œsophagus ; when this point was passed, the extremity of the tube could be moved freely, but still there was reason to suppose that the injected fluid did not reach the stomach.

At the post-mortem examination, the stomach was found to be contracted, and the lower third of the œsophagus was hard and thickened ; it adhered to the left bronchial tube. At the part where the stricture commenced, the walls were in such close apposition that a probe could not be passed through without the employment of force ; below this the ulcerative process had formed a large cavity, at the lower extremity of which the tube was again contracted ; the walls of this cavity were at one point remarkably thin : there were thus two strictures, with an intermediate pouch into which the fluid had passed when introduced by the tube ; the walls of this intermediate pouch had at one point been completely destroyed by the ulceration, but the opening was stopped by a bronchial gland which adhered to the margins of the aperture.

The deceptive sensation which is conveyed to the hand of the surgeon, in examining a stricture that has been partially destroyed by a process of ulceration, was familiar to Sir E. Home. "A bougie passed under such circumstances will, in general, have its point entangled in the ulcer ; and when so skilfully directed, as to go down into the œsophagus, it will meet with a difficulty while it is passing from the ulcerated termination of the sound œsophagus, and again where it leaves the ulcer, and re-enters the sound œsophagus below ; and in its return there will be two parts at which a resistance will be felt. This may mislead the most accurate observer, and create a belief in his mind that there are two strictures, whereas, in fact, there is none, but an ulcer of some extent, and a power of contraction in the upper and lower extremities of the œsophagus, where they terminate in the ulcer." This writer gives a detailed account of a case in which the ulceration proceeded to the formation of sinuses which extended

into the lungs: the symptoms and course of this case are so interesting that we think it worth inserting—in an abbreviated form:—

A lady, fifty-nine years of age, had been remarked from her infancy for having a very narrow swallow, but at that time it could not be considered a disease: it increased as she grew up, and for the last thirteen years of her life was very troublesome; but even before that period she was unable to swallow any substance the size of a pill, and was obliged to masticate her food thoroughly, and swallow it with great caution; for *when she swallowed in a hurry, or was off her guard, it brought on a spasm upon the œsophagus, and she had the sensation of being choked.* This effect was more readily produced when her mind was at all agitated, and at the periods of menstruation. . . . These attacks lasted sometimes only a few minutes, at others thirty-six hours; *they went off always in an instant, and communicated the sensation of something giving way;* they appeared to herself to be brought on by the wind from the stomach opposing and stopping the morsel, and the removal appeared to take place from the wind escaping, and permitting the morsel to pass.

Thirteen years before her death she had a considerable uterine hæmorrhage, which lowered her very much, and from that time this complaint in her swallowing became evidently worse. . . . . She could swallow very little solid food, not being able to give passage to anything larger than a pin's head.

Eight months before her death *she was seized all at once with a fixed pain a little above the pit of the stomach,* under the breast bone, and *a coldness in the stomach with chills down her back;* this went off gradually, but returned in a month much in the same way, and never afterwards could be said to have gone away altogether. At this time the disposition to choking seemed to be diminished, the morsel passed down some way without much pain, but when it was dropping into the stomach, she was thrown into agony from the pain; it was very acute and greatest at the first attempt, but less severe upon repetition; this lasted about a fortnight, when it gradually abated; during this period, and for the remainder of her life, she was unable to attempt swallowing solid food. Besides the fixed pain in the stomach, she had for some time the sensation of an acid in the stomach, and violent retchings; these symptoms gradually and uniformly increased, and for the last six weeks she had an *increase of the secretion of the saliva,* spitting about a quart a day. This produced retching, and what came up from the stomach gave her the sensation of being very hot in the mouth: *latterly she brought up a brown-coloured fluid, like the broken coagulum of blood;* this came after retching. Sometimes, when she attempted

to swallow nourishment, it appeared to pass down to the orifice of the stomach, and then returned with some of this fluid, which looked like coffee-grounds.

A little before death, the debility and marasmus were extreme; there was a *considerable difficulty in breathing;* she had likewise, for the last month, an appearance of aphthae in the mouth, which before death spread over all the fauces and tongue: worn out by these symptoms, and want of nourishment, she died.

Upon examining the body after death, there appeared to be no disease in the stomach itself. The inside of the mouth was covered with aphthae, which did not reach beyond the fauces. The œsophagus, directly behind the first ring of the trachea, was so much contracted that the orifice did not admit a common quill. At this part *there was no apparent disease, the parts were in no respect thickened, and the internal membrane had the natural appearance, only contracted, forming a regular annular stricture.* For about an inch lower down, the œsophagus was externally as small as common in the greatest degree of contraction; after which it became a little larger, although still much smaller than we generally find it. *The coats at this part were thinner and less muscular than natural.* The whole internal surface of the œsophagus, below the bifurcation of the trachea, was, for three inches in length, in a state of ulceration, and the parts surrounding it at this part were all consolidated; this ulcer had two sinuses extending some way into the lungs, but these did not appear to communicate with the air-cells; the aorta at this part adhered to the œsophagus, but was not itself at all affected by the disease.

The ulceration seemed to have begun only eight months before death, as the pain, from food passing into the stomach, came on at that time, which seems to fix the period of the inflammation that necessarily preceded the formation of the ulcer.

In reviewing the condition of parts found in this case, he observes:—"It does not at first sight appear in what way the stricture in the upper part of the œsophagus should produce ulceration in that canal nearer the stomach; and yet this effect resembles so exactly what is met with in strictures in the urethra, ulceration taking place behind the stricture, that it is difficult to suppose the ulceration in the œsophagus unconnected with the stricture. It is probable that in such cases the frequent retching, arising from the phlegm collected between the stricture and the stomach, produces the same consequences as the ineffectual straining of the bladder to get rid of the urine."

Monro[1] has recorded a case in which the ulceration laid open the trachea, and so established a communication between

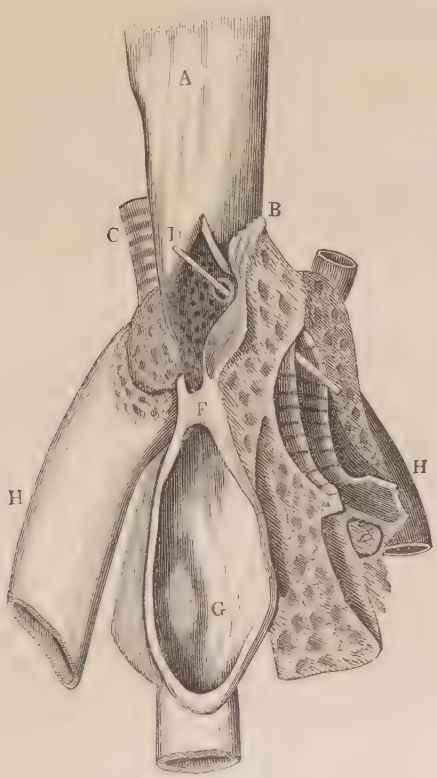

PLATE XIV.

A. The part of the gullet above the stricture which was considerably dilated, and the innermost coat has fallen into folds.

B. The ulcerated part of the gullet above the stricture F.

C. The trachea.

D. A probe passed through an unnatural communication between the gullet and windpipe.

F. The stricture of the gullet, which is *very similar to that of the urethra.*

G. The glands in vicinity of gullet enlarged.

HH. The arch of the aorta.

[1] Morbid Anat., &c., p. 298.

the two tubes. He has illustrated the post-mortem appearances by an engraving—of which Plate XIV. is a copy—which makes the case, perhaps, more instructive than it would otherwise have been :—

I attended for three years a person who laboured under a stricture of the middle of the gullet, during the whole of which time, he was incapable of taking as much food as was sufficient to allay his hunger.

The patient was a letter-carrier, and had therefore been exposed to the inclemency of the weather. The disease *began like a common sore-throat*, he had a slight soreness in the part, and swallowed with difficulty. He had frequent hawking and spitting, probably owing to the neighbouring parts being in an irritable state, and secreting an unusual quantity of mucus. The soreness soon went off, but his voice became much weaker, and the difficulty of swallowing gradually increased. He also breathed with difficulty, and especially upon attempting to swallow, and a part of his food was commonly returned. From the continuance of the disease he became much emaciated, and his pulse was small and quick. Notwithstanding a long protracted course of Mercury, Cicuta, and Hyoscyamus, the disease increased ; and after having laboured under it for three years he died very suddenly.

Upon examining the body, a stricture was found in the middle part of the gullet, half an inch in extent. The œsophagus, internally, immediately above the stricture, was in a state of ulceration, and all the coats of the gullet were found to be eroded, and there was an oblique canal through which a probe could be passed into the trachea. The sudden death of the patient seemed to have been owing to the purulent matter getting into the trachea.

The following case—in which stricture of the œsophagus was followed by ulceration, leading to a fistulous opening into the right pleura—occurred in the practice of Mr. Wardrop :—[1]

Mme. Sache was admitted into hospital in a state of extreme debility and emaciation, and with that peculiar cachetic aspect which almost necessarily accompanies the existence of cancer. She complained of an almost unsurmountable obstacle to the deglutition of food. The bolus, when it had passed down the œsophagus for a certain distance, was immediately rejected by vomiting, accompanied by violent and

[1] London Med. Repos., 1825.

painful convulsive efforts. She was continually afflicted by an acute pain about the level of the lower dorsal vertebræ, at the same point to which she referred the obstruction which opposed the passage of solid aliments and sometimes even of the blandest liquids. Her respiration was natural; a careful examination did not reveal the existence of any tumour in the cavity of the thorax, nor at the orifices of the stomach. Her general health had suffered severely. She was always in a feverish condition, and, as she herself said, "she had become a complete skeleton." She told us that, two years previously, she had felt for the first time, without any assignable cause, some slight difficulty in deglutition, which had ever since been increasing gradually, though slowly, and was always perceived at the inferior extremity of the œsophagus. During the course of the last few months the dysphagia had increased with alarming rapidity; the pain, the fever, the weakness, and the emaciation had increased in like proportion. She had tried, at different times and without the least advantage, all sorts of remedies; opium was the only thing that had afforded her some relief. A small bougie, introduced into the œsophagus, was arrested at the interior extremity of the tube, and could not be passed into the stomach. The operation was followed by violent pain, nausea, and vomiting. Other attempts were made to pass the instrument, but they proved just as painful as the first without being more successful, and it was found necessary to give up the attempt. She was advised to drink as much broth as she was able, and laudanum was ordered in frequent doses; nutritive enemata were proposed, but the patient refused them. From time to time she was able to swallow a small purgative pill. In this state she continued to decline gradually, and at length died of exhaustion.

The autopsy, at which Dr. Barry and Mr. Bennett assisted, revealed the existence of a very firm stricture of the œsophagus, at the level of the tenth dorsal vertebra; it was *formed by a thickening of all the coats* of that tube, which were transformed into a dense fibro-cartilaginous tissue, a character which clearly proved the strumous nature of the affection. At a distance of two inches *below the strictured portion*, an extensive process of ulceration had destroyed the mucous membrane, and at one point had penetrated the other tunics, and the wall of the posterior mediastinum, establishing in this manner a communication with the cavity of the right pleura. The ulcer was of an irregular form, with an unequal base, and covered on the surface with a layer of grayish granulations, from which oozed a fetid ichor. At the base of the right lung, and in the point corresponding to the opening in the mediastinum, was found a small ulcer engaging only the pulmonary pleura; around this ulcer a plastic exudation had been poured out. There was no effusion into the cavity of the thorax; the lungs were sufficiently healthy; the intestines empty; and the stomach presented

that form of contraction which gives it the appearance of an "hour-glass," as described by Sir E. Home, and others.

The symptoms by which the occurrence of the formation of an opening leading from the œsophagus into the air-passages are denoted, have been already considered in detail. This accident, of course, always rapidly hastens the fatal issue.

If instead of opening into the air-passages the ulcer merely eats its way into the surrounding cellular tissue, the result will be extravasation of the ingesta, a portion of which must inevitably pass through the opening at each act of deglutition. This must necessarily give rise to violent inflammation and suppuration, which rapidly spreads through the loose areolar tissue which surrounds the œsophagus. This may prove fatal from the exhaustive suppuration, and the hectic fever to which it gives rise; or the abscess may compress the œsophagus itself so effectually as to prevent completely the act of deglutition, or it may burst into the air-passages, and so, by a more round-about course, lead to the same results as those of direct communication by the original process of ulceration.

The inflammation set up by the extravasation of food may be so violent as to lead to gangrene, as happened in a case recorded by the younger Sedillot.[1] The patient was tormented by thirst from the time of the perforation of the œsophageal wall. To satisfy this, he was constantly trying to swallow some fluid, the consequence of which was that a large quantity found its way into the surrounding cellular tissue. The result of this extensive infiltration was a gangrenous inflammation of the areolar tissue of the whole anterior part of the neck, and an enormous tumefaction which extended from the clavicles to the chin, and rapidly led to the death of the patient by suffocation.

(3.) To this class belongs those rare cases in which narrowing of the œsophageal canal is due to hypertrophy of the muscular coats. This condition must be excessively rare.

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[1] Recueil Periodique, vii., 194.

It was described by Albers under the name of *œsophagostenosis callosa*, and has been included in his classification of strictures by Nelaton, who describes the pathological appearances in the following words :—

"Les couches les plus externes de la tunique musculaire sont intactes ; les couches internes, au contraire, sont épaisses, elles peuvent acquérir jusqu'à un centimetre d'épaisseur ; elles sont indurées, le tissu crie sous le scalpel, leur coupe représente une serie de fibres serrées les unes contre les autres. Cette altération pourrait être prise pour une affection squirrheuse, mais elle en différe en ce qu' elle reste toujours limitée au point où elle s'est développée, qu'elle ne suit pas la marche envahissante des affections cancéreuses : d'ailleurs ce tissu, examiné au microscope, a toute l'apparence des fibres musculaires. Cette altération se rencontre principalement, à l'extrémité inférieure de l'œsophage dans la voisinage du cardia."

Wilks and Moxon, in their valuable work on Pathological Anatomy, mention casually a case of heart disease in which the muscular coat of the œsophagus was of three times the natural thickness, "as if hypertrophied from obstruction by the pressure of the enlarged heart."

In several of the cases of œsophageal obstruction, which have been narrated in different parts of this essay, considerable thickening of the muscular coats existed, but in no case, we believe, was this thickening the cause of the dysphagia, it was in every instance merely a compensatory effort of nature to overcome a previously existing obstacle.

The pathology and course of those forms of stricture, which result from corrosion, syphilitic deposit, &c., have already received sufficient attention, and we shall now proceed to consider the last and most important sub-division of the second great class of cases of "œsophageal dysphagia," viz., those in which that symptom is due to the presence of new growths in the walls of the canal.

(4.) The "new formations" in the wall of the œsophagus, which give rise to dysphagia, are almost always of carci-

nomatous nature. We have already considered the pathology of these growths, their usual site, the peculiarity of their symptoms, and the complications to which their presence may give rise. It will be remembered that, although dysphagia is the earliest symptom in such cases, and continues throughout to be the chief source of the patient's distress, it is, nevertheless, but seldom the immediate cause of the fatal result. We shall now proceed to give some cases, illustrative of the symptoms and post-mortem appearances found in affections of this nature.

We have mentioned the fact, that consolidation, followed by gangrene or sloughing of the lung, is, perhaps, of all others the most frequent cause of death. The following is a good example :—

James R., æt. forty-five, was admitted into Guy's Hospital, November 21, 1854, under the care of Dr. Gull, and died November 30th. He was a married man, a labourer, and intemperate in his habits. For nine weeks prior to his admission he had been unable to swallow food with comfort, and he had suffered from severe pain at the lower part of the sternum. From that time he lost much flesh ; and cough, with pain in his side, came on. He vomited occasionally, and had burning pain at the sternum ; and there was a sense of nausea when he began to eat. On admission he had a cachectic, pale, and wretched appearance ; he was troubled with cough, and the expectorated matters were exceedingly offensive. At the apex of the left lung the respiration was coarse ; and at the base of the right lung there were signs of consolidation ; the voice, both at the base and apices, was increased in resonance. Cinchona and morphia were administered, but the patient sank in a few days. The *severe pulmonary symptoms in this case completely masked the original disease of the œsophagus;* for a short time it was believed that the case was one of pneumonia with old disease of the lung, and that the burning pain at the sternum, and the vomiting, were the consequence of his former intemperate habits. At the commencement of the œsophagus, extensive ulceration was found on inspection ; the ulcer was four or five inches in length, irregularly tubercular on its surface : and several tubercles were situated in the mucous membrane, both above and below the ulceration. The disease extended as low as the root of the lung, but the lungs themselves and the pleura were free from cancerous disease. The tissue, external to the œsophagus, was extensively infiltrated, especially on the right side, and some of the bronchial glands were affected ; the right pneumogastric

nerve extended through the diseased strictures. The lower part of the pneumogastric appeared wasted, but it could not be traced satisfactorily throughout, having been divided in the inspection. The right lung at its lower lobe was of a greenish colour, and it had a faint gangrenous odour; it was infiltrated with dirty serum, and was imperfectly consolidated. The bronchi were intensely congested. The remaining parts of the lungs and the larynx were healthy. The heart, stomach, liver, and intestines, &c., were also healthy; and no cancerous disease could be detected in any other part.

As to the character of the growth, it had the general and microscopical appearances of epithelial cancer. There was no direct communication between any of the larger bronchi and the ulceration of the œsophagus; and it appeared probable that the right pneumogastric, becoming involved in the disease, had predisposed to the pneumonic inflammation on the same side. The disease proved fatal at an earlier period than usual, for the patient died ten weeks after the recorded commencement of difficulty in swallowing, and the diagnosis was rendered obscure by the extreme severity of the pulmonary symptoms.

Epithelial cancer of the œsophagus often establishes a communication with the larynx or trachea. This is the more likely to take place, as epithelioma is almost always found in the upper part of the tube, and principally engaging its anterior wall. Besides, the process of ulceration commences earlier, and proceeds more rapidly, in this than in the other varieties of cancer which we usually find engaging the organ. An example of this complication was brought before the Pathological Society during the last session by Dr. Franks (January 29, 1876). The patient, from whose body the specimen had been removed, had been suffering for about a year before his death. His prominent symptoms were loss of voice and difficulty in deglutition. His voice did not reach much above a whisper, and resembled that of laryngeal phthisis. The dysphagia was so great that he could not swallow any solid food. "Liquids he could, by a series of gulps, and after much straining, get past the obstruction." On laryngoscopic examination the left vocal chord was seen to remain stationary during articulation, while the right moved freely. Mr. Smyly, whose patient he now was, believed that this was due to the presence of a tumour or abscess

pressing upon, and interfering with, the left recurrent laryngeal nerve. About three weeks after his admission into the Meath Hospital, complete dysphagia came on, which was relieved, a few days later, by the escape of a large quantity of pus, during a fit of coughing. The dysphagia now continued—sometimes partial, sometimes complete—till he died. The immediate cause of death was an attack of acute pleurisy. On examination of the parts after death, a large opening was found leading from the œsophagus into the cellular tissue immediately in front of the spine, and another in front which communicated with the interior of the larynx. The mucous membrane over the cricoid cartilage was eroded, and the cartilage itself necrosed. The ulceration had also engaged the recurrent laryngeal nerve of the left side.

Another case, in which epithelioma of the œsophagus opened into the trachea, has been recorded by Hilton. The disease in this instance was complicated with granular degeneration of the kidneys.

John R., æt. fifty, was admitted into Guy's Hospital, under the care of Mr. Hilton, (March, 1856) and died the following day. No history except that he had felt ill for three months, could be obtained. On admission he was suffering from urgent dyspnœa; there was great congestion of the face, and he was apparently dying of apnœa. Tracheotomy was performed by Mr. Callaway, but the patient died in a few hours. The body was spare, but muscular. The epiglottis was pale, and its mucous membrane slightly œdematous; near the arytænoid cartilage was a small circular ulcer, At the commencement of the trachea was the artificial opening, and two inches and a quarter below it, and an inch above the bifurcation, was a vertical opening about half an inch in length, extending into the œsophagus: the membrane around the perforation was of a dull grey colour; and the mucous membrane of the trachea and of the bronchi was much congested. Nearly three inches above the commencement of the œsophagus was an ulcer, three inches in length, with raised, irregular edges, and with a ragged surface; at its base was the opening into the trachea; the remaining part of the canal was healthy. Neither bronchial nor cervical glands were affected. The lower lobe of the right lung was in a state of red hepatization, becoming grey; and in the left lung was a lobule broken down from acute disease. On the right pleura there was effusion of lymph. The kidneys were small, granular, contracted, and contained cysts. The other viscera were healthy.

An ulcerating cancer of the œsophagus may also prove fatal by laying open one of the great vessels: a good many instances of this have been recorded. In the following case the communication was with the aorta :—

John G——, æt. 60, a labourer, was admitted into the London Hospital on October 9, 1860. Three months before his admission he had experienced a difficulty in swallowing, which continued painful ever since. Part of his food and drink was always returned, and for the last two months nothing more solid than gruel could be got down. The bolus was arrested a little below the level of the sterno-clavicular articulation . . . . Vomiting of blood suddenly set in, which was soon followed by death.

On post-mortem examination, a cancerous stricture of the œsophagus was found, which had encroached on the calibre of the canal so much that the latter only admitted a goose-quill at the affected point. It was very dense, and a ragged ulcer had formed on its inferior aspect. At the point where the descending aorta lay underneath the left bronchus an opening was found, through which the hæmorrhage had taken place. The aorta at this point was split on its under surface. A lamina of two lines in depth, and easy separable, was found around this split. Its margins were frayed, and on separating them a pin-hole aperture was found leading into the aorta.

There was no erosion of the trachea or bronchi.

An interesting case of scirrhus of the œsophagus which proved fatal by opening into the left subclavian artery, was exhibited to the London Pathological Society by Dr. Dickinson, on March 30, 1861 :—

The patient had been admitted into St. George's Hospital for dysphagia. He presented a pale and sallow appearance. On examination, no tumour could be detected in the throat to account for the difficulty of swallowing, nor was there any evidence of disease of the lungs : cancer of the œsophagus was accordingly diagnosed.

A week after admission, he was at the water-closet at night; he fainted there, and on recovering passed a bloody stool. Early on the next morning he vomited a little blood. . . . He died a short time after.

On examining the body after death a malignant stricture of the œsophagus was found. It was of the scirrhus variety, and immediately below it was an ulcerated surface, from which a small opening led into the subclavian artery of the left side.

When the cancerous ulceration has merely eroded the

walls of the œsophagus without laying open any of the great vessels, it will merely give rise to the symptoms and consequences of perforation from any other form of ulceration, viz.—extravasation of the ingesta into the surrounding areolar tissue, with formation of abscesses, attended by hectic, &c. This complication will, of course, hasten the fatal result.

Plate XV.

Plate XV. represents the appearances presented by the morbid specimen in a case of cancerous ulceration situated at the cardiac orifice of the stomach, and engaging the adjoining parts of both stomach and œsophagus. The patient, from whose body it was taken, was admitted into the ——— Hospital in February, 1836, complaining of difficulty in swallowing, which had commenced nine weeks previously and had rapidly increased. He was sixty years of age, and was

considerably emaciated; he suffered much from flatulence and singultus. The food was stopped immediately above the lower extremity of the tube, and after a little delay, was either rejected suddenly by regurgitation, or found its way gradually through the obstruction into the stomach. If it succeeded in reaching the stomach it was retained.

The symptoms gradually increased in severity, and on the 11th of March diarrhœa set in with copious liquid discharges, which were "tinged with blood." From this time the patient rapidly sank, and died on the 13th. The following is the description given of the post-mortem appearances:—"The constricted tube will only admit the passage of a middle-sized bougie. Above the constriction the coats are thicker than natural, and the muscular fibres are hypertrophied: below the stricture, and occupying the cardiac orifice of the stomach, there is a large cancerous ulcer, with an irregular margin, and foul sloughy surface. The thoracic lymphatic glands between the trachea and œsophagus were enlarged, and of a stony hardness."

A case been recorded by Dr. Rees, of Guy's Hospital, in which malignant ulceration of the œsophagus had eroded the pleura of the right side, and caused death by acute pleurisy:—

The patient, a man aged fifty-eight, was admitted into the hospital in a state of collapse, with symptoms of acute pleurisy. No history was obtainable. In spite of the treatment which was adopted, he continued to sink, and died soon after his admission.

On post-mortem examination a large extent of the œsophagus was found to be converted into a mass of cancer. *All traces of the tube were lost from the bifurcation of the trachea to the stomach.* A large cancerous sloughing surface formed the whole of the interior of the space through which the food passed in its course to the stomach. Its walls were thick, and composed of tolerably firm cancer. The disease ceased at the cardiac orifice of the stomach. The right side of the chest was full of a dirty-brown coloured, highly fetid liquid, by which the lung itself was compressed. It was evident that the disease of the œsophagus had ulcerated through the pleura, and had caused death by setting up a fatal pleurisy.

The following case of epithelioma of the œsophagus, which has been published by Mr. Hilton Fagge,[1] presents some

[1] Guy's Hosp. Reports, 1871-72, p. 413.

features of unusual interest in its history and etiology. "The specimen itself [*vide* plate XVI.] displays epithelioma of the œsophagus, with ulceration and affection of a lymphatic gland. But below the part which is the seat of cancer the œsophagus is greatly narrowed, and here there is no indication of any change beyond a simple stenosis. It has, therefore, appeared to me, and to others to whom I have shown the preparation, that the epithelioma has been of comparatively recent development, and that the long standing dysphagia was caused by the narrowing of the cardiac end of the œsophagus."

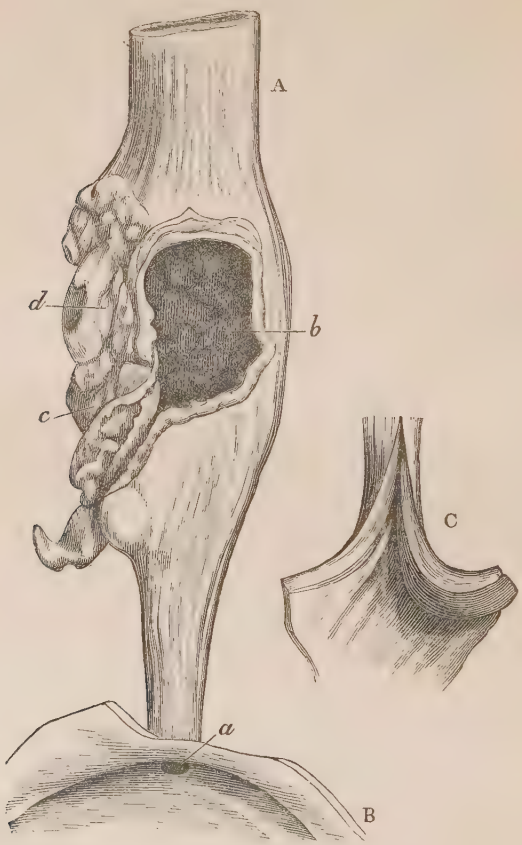

PLATE XVI.

Mr. J. L., æt. eighty-four, at the time of his death, had for upwards of forty years had a difficulty in swallowing food. He thought it originated in the habit of eating fast. When it first came on it seemed to him as if, when he swallowed anything, the wind met it and forced it back. In consequence of this difficulty of deglutition, all the solid food he took was divided into very small portions. In the last twenty years of his life, whenever he happened to eat a morsel exceeding a certain size (and that very minute), it lodged in the œsophagus, and for several days, or even more than a week, he would take neither food nor drink.

He used to wash down solid food with liquids, and often drank before taking food. He was not known to suffer from sickness. Nor did he ruminate nor bring up his food in pellets. He never had a bougie passed down his throat. For some time before he died he was extremely weak, being only just able to walk from room to room. He indulged to excess in the use of spirits. About three weeks from the day of his death, on rising one morning, he fell back exhausted, and from that time he lay in a semi-lethargic state, speaking very little, and taking only small quantities of fluids. He was, however, able to swallow fluids to the very last. He brought off a little blood occasionally, but there were no other symptoms pointing to the occurrence of ulceration in the affected part. . . . .

On post-mortem examination it was found that *the body was by no means emaciated;* there was a rather thick layer of fat over the abdominal muscles, and a good deal in the omentum. . . . The upper part of the œsophagus is rather less than an inch in diameter (A). This calibre is maintained as the gullet descends, until a point about four and a-half inches from the cardia. Here it becomes slightly dilated, its diameter reaching one and a-half inch. About two inches lower it again becomes narrower, at first rapidly, afterwards more gradually, so that the shape of a funnel is pretty closely imitated. The narrowest part of all is at the termination (*a*) of the œsophagus in the stomach (B). Here the calibre is so small that an ordinary lead pencil is firmly grasped by the gullet.

At its widest part the walls of the œsophagus present a large irregular opening (*b*), two inches in length, which is evidently in part the result of an ulceration, but which may also in part have been caused by injury during removal from the body. On one side the lung is adherent (*c*); there is also close to the outside of the gullet a lymphatic gland, which is the seat of epithelioma. The coats of the œsophagus are greatly thickened; the longitudinal fibres are very distinct, and within these the transvere fibres are greatly hypertrophied. In the upper part of the tube the thickness of the coats is one-fifteenth of an inch; just when the œsophagus opens into the stomach it reaches one-fifth of an inch. (This is shown at C.)

Microscopic examination proved the disease to be of the nature of epithelioma.

(*d*) A mass of fatty tissue from root of lung.

The occurrence of this case following an old standing dilatation is remarkable, and worthy of consideration. The coats of the tube were hypertrophied, the submucous areolar tissue especially was very much thickened, and we have little doubt

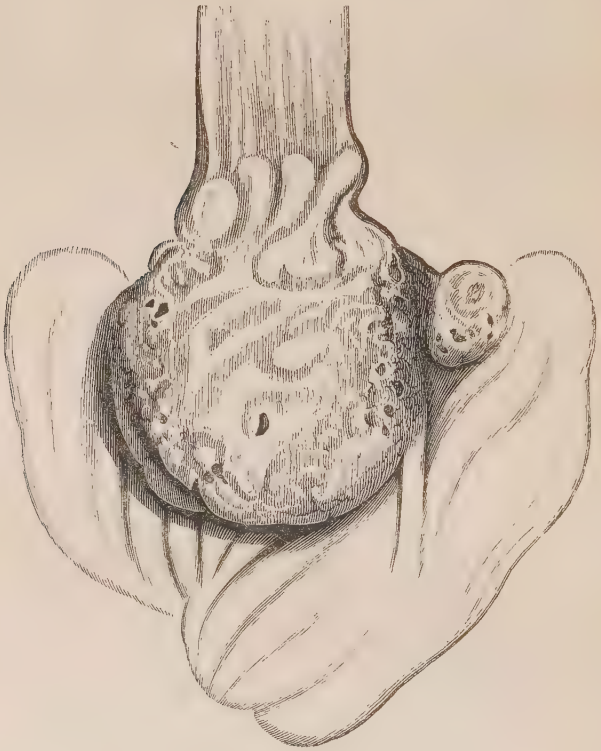

PLATE XVII.

that in this case the constriction which was found near the cardiac end of the tube was the result of thickening and contraction originally caused by an inflammatory process. The dilatation was then a secondary result, and the carcinomatous degeneration probably commenced in the lowly organised

fibrous tissue which is formed in the submucous layer in chronic catarrhal inflammations. Carcinoma seems to spring up very often in the cicatricial tissues of old strictures of the œsophagus. Mondiere has collected several cases which go to prove this point.

It is also very remarkable how often the origin of cancerous disease of the œsophagus is dated by the patient from "catching cold," or any other cause which might set up the inflammatory process—such cases may, we believe, be accounted for in exactly the same way.

Plate XVII. represents a specimen of encephaloid cancer ("cerebriform tumour") situated at the cardiac end of the œsophagus. It occurred in the person of a patient, æt. sixty-four, and a widow. She was admitted into the —— Hospital, suffering from all the symptoms of stricture of the œsophagus, which had first appeared about three months before, and had been gradually increasing. She had constant lancinating pain near the situation of the cardiac orifice of the stomach, from which it darted along the course of the œsophagus, and every attempt to swallow was immediately followed by vomiting. As a result of these symptoms, the patient was reduced to a state of great emaciation and debility. A few days after her admission, she was attacked with diarrhœa, from which she rapidly sank, and died in about a week.

The fungous mass—which occupied the cardiac orifice so completely as almost to occlude the passage—presented the characteristic appearances of this variety of malignant disease. It was about an inch and a-half in length, and engaged the whole circumference of the tube at this point.

Plate XVIII. (copied from Plate X. in Monro's Morbid Anatomy of the Gullet, &c.) represents "a stricture occasioned by cancerous tumours of the cardia, and also a cancer of the stomach, from the villous coat of which a number of fungous tumours grew." Monro had himself received the preparation from Dr. Home.

A very curious and instructive case, in which the dysphagia had been due to the development of tubercle in the sub-mucous tissue of the œsophagus, was brought before the Pathological Society by the late Professor R. W. Smith.

The specimen was taken from the body of a man, aged forty-five, who had died, under the care of Dr. Kirkpatrick, in the hospital of the North Union Workhouse.

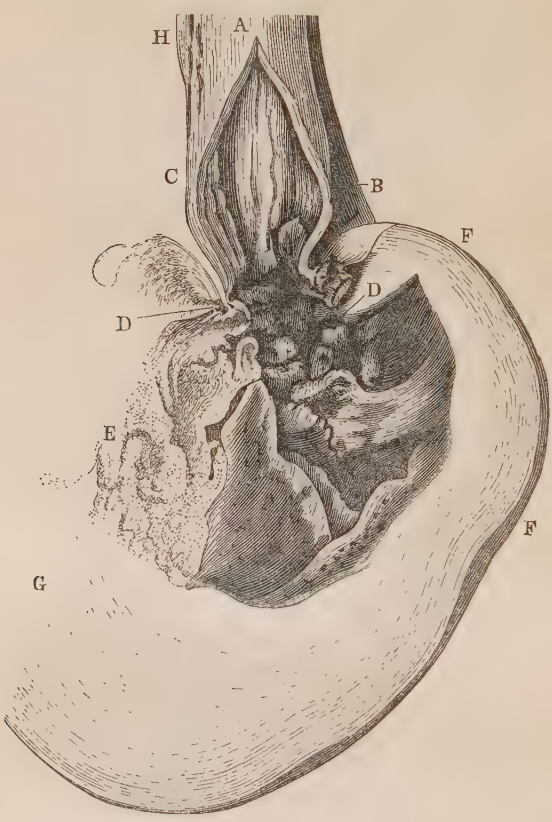

PLATE XVIII.

ABC. The gullet opened; it was much dilated; and has fallen into folds. The tumours at the cardia were about the size of small olives.

DD. Points out the fungous tumours within the great left sac of the stomach.

E. Represents slight ulceration, extending along the smaller curvature of the stomach towards the pylorus.

FF. The greater curvature of the stomach.

H. The par vagum of the eighth pair of nerves, which was much larger than is usual.

He had been admitted into that Institution about eight months before, labouring under some of the symptoms of stricture of the œsophagus; he experienced difficulty in swallowing either solids or fluids, but was not emaciated, nor did he exhibit the aspect of malignant disease. After remaining in the Workhouse for some time, he was discharged, but about four months ago he returned. The usual symptoms of stricture of the œsophagus were now well marked. There was extreme difficulty in swallowing, the deglutition of fluids was peculiarly difficult and painful, and he was emaciated to the last degree. About two months after his second admission, the symptoms of pulmonary consumption set in, and it was very remarkable that in proportion as these increased, those of obstruction of the œsophagus diminished; and, in fact, about a month before the patient's death he could swallow both solids and fluids without any difficulty, but not without pain.

The post-mortem examination detected an example of stricture of the œsophagus, arising from a development of scrofulous tubercles between the mucous membrane and the muscular coat of the tube. In the situation which the stricture originally occupied, viz., about two and a-half inches above the cardiac orifice of the stomach, an immense cavity was observed; the posterior wall of the œsophagus was wholly destroyed throughout an extent of at least three inches, and the back of the cavity alluded to was principally formed by the front of the thoracic aorta, and the condensed cellular tissue of the mediastinum. This cavity communicated with the left lung, a little below its root, and the lower lobe of this organ presented a well-marked example of the third stage of pneumonia. Immediately above the cavity formed by the ulceration of the œsophagus, there existed, beneath the mucous membrane of the lobe, a scrofulous tumour as large as a bean. Softened tubercles and cavities were found in the apex of each lung. (Plate XIX. represents the parts as seen from behind.)

Mr. Smith, in reviewing the features of this case, observed that it was "interesting as affording an example of stricture of the œsophagus arising from the presence of scrofulous tumours beneath the mucous membrane, a cause of stricture in this situation by no means of frequent occurrence. The disappearance of the signs of obstruction for some months before the patient's death was an important feature in the case, and was to be ascribed to the softening and ulceration of the tumours. The practitioner should, therefore, bear in mind that the subsidence of the symptoms of stricture does

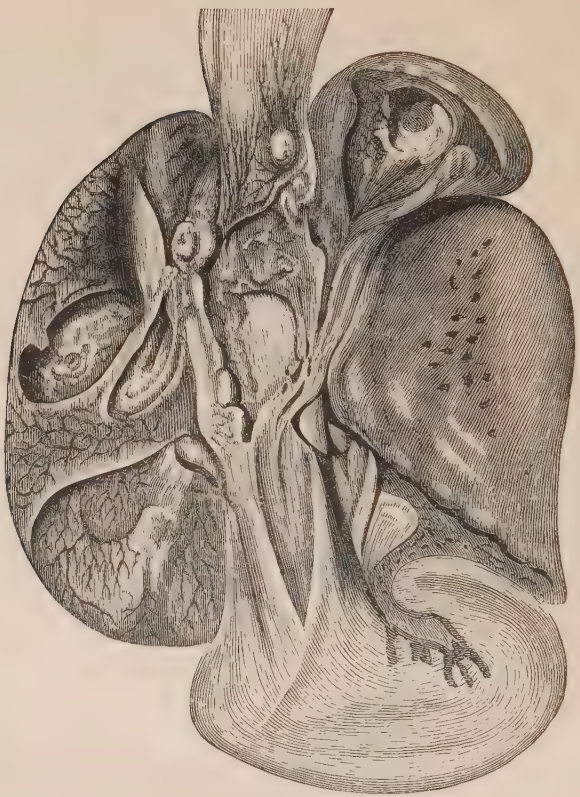

PLATE XIX.

not necessarily indicate that the disease is in process of cure; ignorance of this fact might induce him to prognosticate the recovery of the patient at the very time that the disease is rapidly advancing to a fatal termination."

III. The last great class of those cases in which "œsophageal dysphagia" is the prominent symptom, includes a pretty large proportion of the examples of dysphagia which are met with in practice.

The "compression" of the œsophagus may be due to any one of a great number of causes. It may be due to aneurism of the aorta (the commonest cause), or to aneurism of one of the other great vessels in its neighbourhood; it may be

caused by a mediastinal tumour—whether benign or malignant in its nature; by abscess in the immediate neighbourhood of the canal; by exostosis of one of the cervical vertebrae; by distension of the pericardium from effusion of serum or pus; by an enlarged thyroid gland, &c.

The dysphagia in cases of this kind is never so complete as in those instances in which it is due to changes in the wall of the tube itself. The reason of this will be easily understood when we remember that in the former the peristaltic action of the œsophagus is carried on with its usual vigour, whereas in the latter it is necessarily diminished—over the greater part of the tube, perhaps—and is of course completely lost at the affected part. Besides, the tube is only pressed on one side.

It was remarked by Mondiere—and his observation has been often confirmed since—that in most cases of aneurism of the aorta, dysphagia is either very slight, or altogether absent: "Il est une chose remarquable, et dont il est difficile de se rendre compte, c'est que presque toujours, dans dix cas au moins sur douze, où on a vu les aneurysmes de l'aorte s'ouvrir dans l'œsophage, la deglutition n'a été nullement gênée." In proof of this point he refers to a large number recorded cases. One of these is that of Laennec,[1] who, in 1822, presented to the Académie de Médecine the morbid specimen of an aneurism of the aorta, which had attained a considerable size, and had eroded both trachea and œsophagus, yet the patient, although he had for a long time spat and vomited blood at intervals, had never suffered from either dyspnœa or dysphagia. Similar cases have been met with by Fleury,[2] Bouillaud,[3] Bertin,[4] Ovurard,[5] Raikem,[6] Laennec,[7] Fizeau,[8] Fauconneau—Dufresne,[9] Sauvage,[10] &c.

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[1] Revue. Med., viii., 479.
[2] Ephemerides de Montpellier, vi., 219.
[3] Traite des maladies du coeur, p. 110.
[4] Bulletin de la Soc. Med. d'Emulation, 1812, p. 14.
[5] Reflex de Med. Malig, &c.
[6] Bulletin de la Faculté, 1812.
[7] Traite de l'auscultation.
[8] Biblioth. Med. liii., 68.
[9] These. 1824, No. 220, p. 25.
[10] Nosolgie Methodique, viii., 81.

"Chez tous les malades dont ces auteurs nous ont transmis les observations, l'aorte plus ou moins dilatée souvrit dans l'œsophage, et jamais cependant ils ne se pleignirent de gêne dans la déglutition. *Nous rapportons le fait sans chercher à en donner une explication.*" The present writer is of opinion, that the explanation which he has ventured to give will, at least partially, account for what would appear, at first sight, a somewhat anomalous feature. In some cases of aortic aneurism, however, dysphagia gives a considerable amount of trouble and distress to the patient, although it never approaches in severity that which is caused by organic obstruction, and some other pathological conditions of the œsophageal tube itself. The present writer had an opportunity, during a great part of the present session, of observing a case of thoracic aneurism in which dysphagia was a prominent symptom.

The following remarkable case of œsophageal dysphagia, produced by an aortic aneurism, has been reported by Armiger[1]:—

J. M'L., æt. forty-three, ... complained that whatever he swallowed seemed to stop in his breast, that he felt great uneasiness just below the margin of the ribs on the left side, and that he seldom or never obtained relief, till, by frequent efforts, he succeeded in expelling the *solid matter which would not pass downwards* . . . . (The signs and symptoms from which diagnosis of aneurism was made are next detailed). . . . He was now much emaciated, and his strength much impaired; he stooped considerably; and in that posture, while leaning on his stick, or other firm support, was easier than when erect; more so when lying in bed, but most of all when resting on his knees and elbows. . . . His sustenance, during March and the preceding month, had consisted of tea, porter, and thin soup; and as the softened barley from the soup was generally rejected, there could be no doubt of stricture of the œsophagus. . . . (He died suddenly, after vomiting a large quantity of blood). . . . On examination of the body, an aneurismal tumour was found opposite the 8th, 9th, 10th, and 11th dorsal vertebrae, and connected with the descending aorta. It had burst into the œsophagus about two inches above the cardiac end.

Another case of aortic aneurism, causing very marked dys-

[1] Med. Chir. Trans. ii., 244.

phagia, and eventually sloughing of the œsophagus, is given by Habershon :—

James F., æt. 34, was admitted into Hospital, November, 1855, and died in January, 1856 ; he was a temperate man, married, and a labourer by occupation. Six months before his admission, after having been engaged a short time previously in carrying very heavy weights, he experienced pain in the left breast ; this pain became much more severe, and also extended between his shoulders, but there was no tenderness in the back. December 4th : the pain at the left nipple became more fixed, and there was a slight systolic bruit. January 1st : it was noticed that the radial pulse was weaker on the right side, and he was found to have difficulty in swallowing solids. This dysphagia increased in severity, and the dyspnœa became more distressing. January 20th : he was *unable to swallow food ;* his face was livid, dyspnœa urgent, and his pain severe. He died on the 25th. On examining the chest, the lungs were emphysematous, pale, but moderately collapsed. There was acute inflammation of the pericardium, and considerable injection of the pleura on both sides. On turning aside the lungs an aneurismal tumour, about the size of a large orange, was found at the termination of the arch of the aorta ; its walls were thin, the posterior part of the vessel was entirely destroyed, and communicated with a cavity in front of the vertebrae, one of which was absorbed. There was scarcely any fibrin in the sac. The aneurismal tumour had pressed upon the œsophagus, and quite obliterated its canal ; the whole of its walls were of a greenish colour, very offensive, and in a sloughing condition. Still no perforation had taken place. Both bronchi were compressed. Two other aneurismal tumours were found connected with the ascending and transverse portions of the arch of the aorta. The other viscera were healthy.

The same writer quotes from Dr. Addison the particulars of another case of aortic aneurism which compressed the œsophagus and left bronchus, and ultimately proved fatal by a sudden attack of dyspnœa. The patient had been suffering for nine months from some of the symptoms which usually accompany thoracic aneurism, and " for several months had suffered from difficulty in deglutition, so that on admission he was unable to take solid food ; but fluids were easily swallowed."

One evening " after taking his tea he washed up the things for the nurse, and immediately afterwards he was seen sitting on the edge of his bed, unable to speak and scarcely able to breathe. He never spoke

afterwards, but died in about a quarter of an hour, the heart continuing to beat after he had ceased to breathe."

On inspection of the body after death : "About one inch below the left subclavian artery, was an oval opening into the aorta, with rounded edges, extending into a large cavity, about four inches in diameter ; this cavity was bounded posteriorly by the vertebræ, which were corroded ; the tumour pressed upon the left bronchus, and upon the œsophagus, and probably upon the thoracic duct. The lungs were healthy."

In reviewing this case Habershon observes : "The sudden fatal apnœa was due, probably, either to injury of the laryngeal nerves and spasmodic action of the larynx, or to sudden distension and increased pressure on the bronchus." We are inclined to ascribe the fatal issue to the former cause, as we do not think it likely that an increase in pressure on *one* bronchial tube, even if sufficient to obliterate it, would be enough to produce so rapidly fatal a result ; more especially as the tube had been partially compressed for a long time previously.

Another condition which has been known to give rise to dysphagia is the presence of a large amount of fluid in the sac of the pericardium. Examples of dysphagia arising from each of these causes have been recorded by Dr. Stokes. In one case, of which he exhibited the morbid specimen to the Pathological Society (April 21, 1843), an aneurism of the arch of the aorta compressed the œsophagus, giving rise to intense dysphagia. This patient's illness had commenced in May, 1841, with pain in the lower part of the back and about the false ribs, which was attributed to caries of the vertebræ. In a few months spasmodic cough came on, with a crowing sound ; dypsnœa also appeared, which was aggravated by exertion, or by standing unsupported, but which was relieved by the use of crutches, or by leaning forwards. The next symptom was that of dysphagia. He had been treated for the supposed spinal caries by inserting issues on either side of the spine, and, "it is an interesting fact, that the symptoms improved when the issues began to discharge. . . During the entire of last winter the patient was free from distress, except when the discharge from the issues became scanty or interrupted. Early in the spring of 1843 the dysphagia

returned, and in an intense degree; the food did not appear to get into the stomach, but was rejected after remaining in the œsophagus for some time. . . . The issues were re-opened; he was relieved of the dysphagia, but on the 15th of April he was attacked by diphtheritis; a bronchial affection came on, and he died asphyxiated." On examining the body after death, a very large aneurism was found "in the commencement of the descending portion of the aorta; this aneurism was filled with solid coaguls; the bodies of four dorsal vertebræ were eroded, the left bronchus and the œsophagus were strongly compressed by the aneurismal tumour, and both these tubes were perforated, the bronchus by one opening, the œsophagus by two, one placed at each side and nearly opposite to each other; the perforation and approximation of the sides of the tubes formed a kind of canal (obliquely placed, and somewhat valvular) which communicated with the aneurismal tumour; its termination in the latter was closed by the coagula of the sac; . . . . there had been no hæmoptysis at any time."

The same illustrious physician has recorded a case in which compression of the œsophagus was caused by the presence of an immense collection of pus (thirty-six ounces) in the sac of the pericardium.

Abscesses in the immediate neighbourhood of the œsophagus may also compress the tube, so as to interfere with the act of deglutition, to a greater or less extent. A striking example of the terrible effects of such pressure in extreme cases was published by Dr. Ballot:—[1]

The patient, a man of forty years of age, and of intemperate habits, had been exposed to cold, and had suffered some days from sore-throat. The pharynx was found, on examination, to be red and dry, but not perceptibly swollen; deglutition was difficult, and the patient could not speak aloud. He complained of pain in the pharynx, and the sensation of a foreign body there. The finger, on introduction, distinguished a tense, elastic swelling on a level with the upper part of the larynx, apparently continuous with the glottis, and perceptibly diminishing its aperture. . . . . The symptoms were not relieved by

[1] *Vide* Dub. Med. Press, vol. vii.

the treatment adopted. Paroxysms of threatening suffocation set in, and laryngotomy was performed to relieve the patient's distress, and save from the impending apnœa. (The case was now believed to be one of œdema of the glottis.) No marked improvement followed on opening into the larynx, but as soon as the canula was introduced into the trachea, the patient breathed freely. . . . . During the night the canula became displaced, and in the morning the patient was found suffocated. On post-mortem examination, it was found that no tumefaction of the glottis existed, but that its orifice was almost entirely osed by a fluctuating swelling of the size of a hazel-nut, which projected over its upper part. It extended downwards below the cricoid cartilage, and compressed the cavity of the larynx considerably. It was formed by a collection of healthy pus which was in contact with the anterior wall of the vertebral column, and the posterior surface of the œsophagus, and extended along the sides of the larynx in such a manner that on the left side it was more than a quarter of an inch from the upper angle ef the incision made between the thyroid and cricoid cartilages. This circumstance explained the prominence felt by the finger passed into the pharynx, and also the reasons why respiration was so much impeded ; and why the canula, introduced into the opening, had such a constant tendency to become displaced.

Another case of compression of the œsophagus by an abscess which had formed without its walls was brought before the Pathological Society by the President, Dr. Hayden.[1] The patient, a man of fifty, had been under treatment for a severe cold about a month before his admission to hospital. A few evenings before, he was suddenly attacked with symptoms of difficulty in respiration, and slight dysphagia. When seen by Dr. Hayden he was suffering from symptoms of imminent asphyxia, and as there was no evidence of organic disease of the lungs or vascular system, the operation of tracheotomy was thought advisable, and was accordingly performed. The breathing was relieved for a time, but the symptoms reappeared in all their former severity. On getting him to make a forced expiration about a pint of pus was discharged through the canula, which gave immediate relief. . . . He sank a few days after.

On post-mortem examination there was found, on detaching the œsophagus from its connections with the posterior surface

[1] April 23, 1864.

of the cricoid cartilage, "a vast cavity which had been a short time previously filled with pus, but was now empty. This cavity extended downwards between the œsophagus and trachea to the posterior mediastinum, when it ended in a cul-de-sac. It had likewise extended upwards to the larynx, and eroded the base of the arytenoid cartilages, detaching them from their articulation with the cricoid, and forcing them forwards upon the glottis: this, no doubt, was the principal cause of the dyspnœa. The pus had then descended in front of the posterior portion of the cricoid, detaching its lining mucous membrane, and had eroded and denuded the posterior surface of that cartilage. The cavity had extended laterally, so as all but completely to insulate the œsophagus."

"On opening the œsophagus itself, we found a large ulcerated passage upon its anterior wall, by which the contents of the tube had passed between the œsophagus and trachea. The margins of this opening were bevelled at the expense of the mucous surface, showing clearly that the disease had originated in the latter.

. . . . "The disease appeared to have originated in ulceration of the œsophagus, which extended into the lax areolar tissue between that tube and the trachea, then giving rise to inflammation, and the formation of abscess, which, by its extension and pressure on the glottis, gave rise to the symptoms of asphyxia. The pus subsequently passed into the trachea and filled the bronchial tubes, causing the second attack of dyspnœa. . . . ."

Any of the various kinds of mediastinal tumour may, of course, by its pressure give rise to œsophageal symptoms similar to those of which so many instances have been already given in the pages of this essay. The presence in the neighbourhood of the œsophagus of carcinoma, lymphoma, lymphosarcoma, or any other of these long-named growths (for an explanation of whose nature we beg to refer our readers to the latest German works on pathology), will be sufficient to give rise to dysphagia of greater or less degree, according to the size and position of the tumour. Also, exostoses or nodes growing from the anterior surface of the bodies of the cervical

or dorsal vertebræ have been known in rare instances to cause the same symptom. It is unnecessary to inflict any other examples of this kind on those whose duty it is to read through the already too-protracted pages of our essay.

The last variety of "œsophageal dysphagia" to which we shall call attention is that singular form described by Bayford[1] under the name of

Dysphagia Lusoria.

According to this writer "dysphagia lusoria" is due to an abnormal course of the right subclavian artery, arising from the left side of the aortic arch, and passing to the right across the œsophagus, so as to compress that tube. The case described by him is briefly as follows :—

A woman, Jane Fordham, had been from her infancy observed to have some difficulty of swallowing, but it was not much attended to till she entered into her thirteenth year, when she first experienced those symptoms which commonly precede the eruption of the menses. Nothing did her good but repeated bleedings. Every month she lost blood once or oftener, for without it she could not swallow without extreme difficulty, and a dread of actual suffocation. Violent exercise, and "everything that heated the blood," increased the dysphagia, which went on for many years continually augmenting. In the last twenty years of her life this poor creature could scarcely, from day to day, muster up resolution to force down food to prevent her starving. The difficulty she described as arising from an obstruction in that part of the œsophagus which is opposite the first bone of the sternum. The food did not return when it came to that place, but it seemed to make a momentary stop ; and at this instant she felt an inexpressible something approaching to strangulation or suffocation, which she could only compare to what she conceived of the agonies of death. Upon these occasions she experienced violent palpitations of the heart. Solids gave her less uneasiness than fluids, for which reason she partook very sparingly of the latter. She fancied she nourished within her a voracious animal, and attributed all her uneasiness to the fury with which this half-starved monster fell upon each morsel in its passage to the stomach. She died at the age of sixty-two. At the post-mortem

[1] Mem. of the Med. Soc. of London, vol. ii.

examination the œsophagus and stomach are stated to have been perfectly healthy. The only condition found in the dead body to which the dysphagia could be referred was an abnormal course of the right subclavian artery, passing from left to right between the œsophagus and trachea.

The name *dysphagia lusoria* was given by Bayford to this affection from the *lusus naturæ* which accompanies it. The literature of this affection since his time has been chiefly German. Richter,[1] Valensen,[2] Auctenrieth Pfeidner,[3] and others, have since observed instances of this singular affection. Fleischmann and Rudolphi have questioned the reality of its existence, because an irregular course of the subclavian artery has been observed without producing any such difficulty in swallowing, but Schonlein has answered this argument, by asserting that dysphagia lusoria depends on the peculiar course of the abnormal subclavian artery. It may pass either before the trachea, between the œsophagus and trachea, or between the œsophagus and the vertebral column. In the second of these cases alone will the peculiar symptoms of dysphagia lusoria manifest themselves.

English writers are, for the most part, silent on the subject, and are also, for the most part, we think, of the opinion that an abnormal course of the subclavian artery is not likely to interfere with the functions of the œsophagus unless the bloodvessel be dilated or aneurismal.

[1] Chirurg. Bibl., x., sec. 365.
[2] Jour de Med. Chirurg. et Pharm, 1791.
[3] Dissert. de Dysphagia Lusoria, Tubingen, 1806.

In conclusion, the writer begs to offer, as some slight excuse for the innumerable faults with which he is conscious that the preceding pages are studded, the consideration of the circumstances under which they are written. The position of a student preparing for his "first-half" examination, is by no means a favourable one for the production of an erudite or flowery composition—while the writer's imagination is perpetually haunted by the grisly shadows of the dreaded examiners rising ever and anon before his mind's eye. Whether he has done a tolerable amount of justice to his subject, or whether he has, at least, done less violence to it than other competitors, remains, of course, for his judges, not for him, to say.

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